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November 15, 1948

STEEL

The Magazine of Metalworking and Metalproducing

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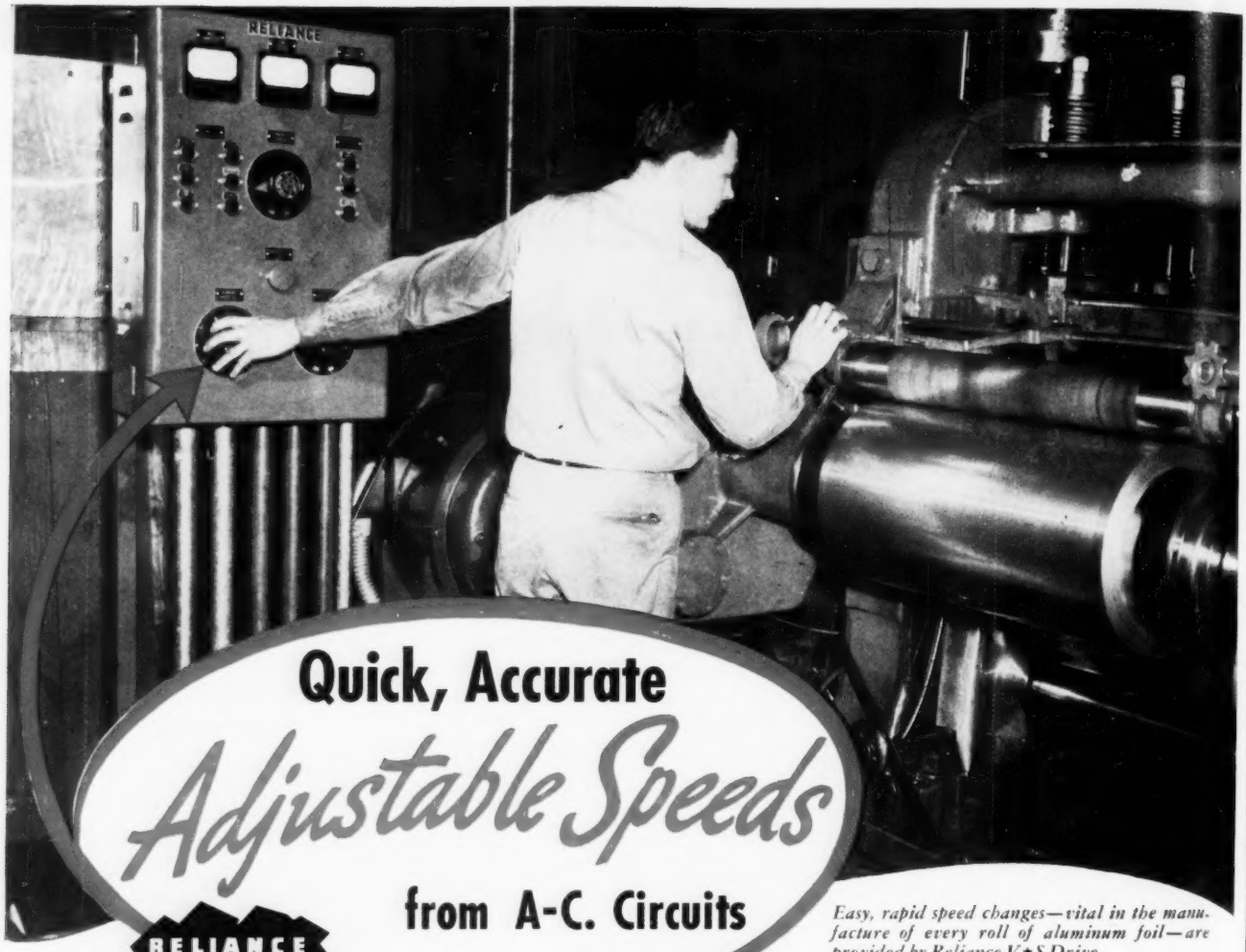

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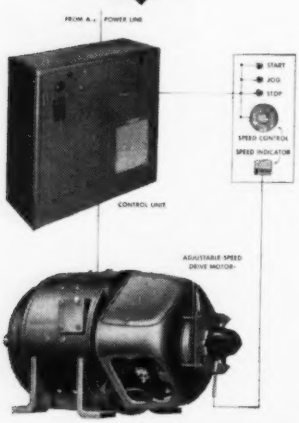

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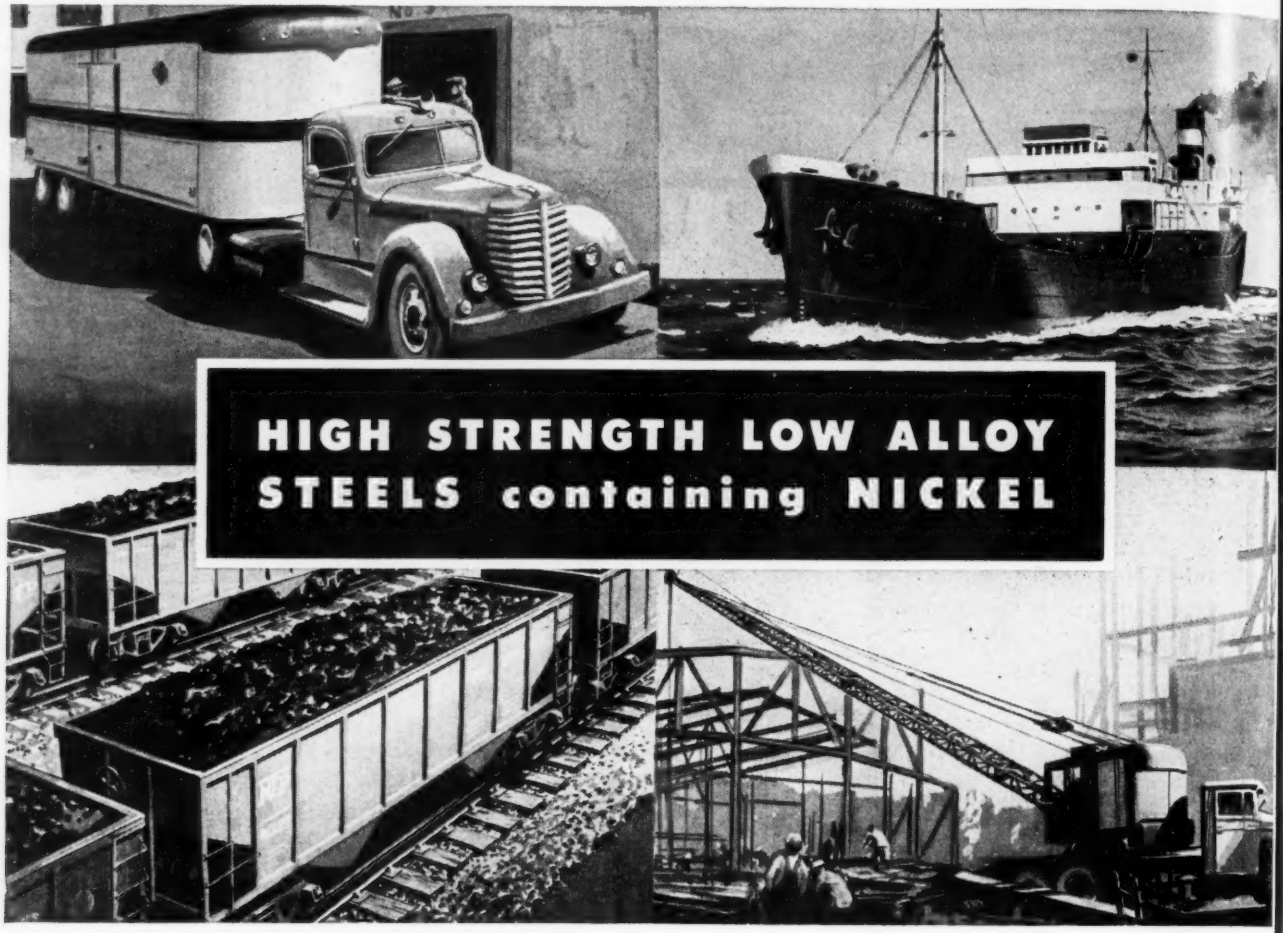

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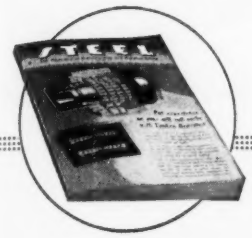


November 15, 1948

Public Relations

On this page last week it was stated that American industry has been spending hundreds of millions of dollars in educational campaigns in the belief that if the average citizen can understand industry properly he will support it staunchly. Doubts as to whether or not this is the best approach to solving industry's difficult public relations problem have been smoldering for years. The surprising result of the Nov. 2 election has fanned these embers into flame. Today we are fully justified in re-examining our concept of public relations critically.

One weakness in the present set-up is that it makes it too easy for too many people to jump to wrong conclusions. We assume that inasmuch as industrial executives as a rule are not versed in dealing with the public mind deftly, the job has to be done by public relations specialists. Therefore a campaign is developed in which the experts do the work and the industrialists put up the money.

In most cases the campaign is based upon the assumptions that industry—usually referred to as the free enterprise system—is perfect or nearly so; that the executives who administer the system are uniformly intelligent, capable and high-minded; and that the public, having exhibited apathy if not antagonism toward business, is in dire need of enlightenment and education.

These partly false assumptions lead to others equally erroneous. The average citizen, reading an ad prepared by the National Association of Manufacturers or other sponsor, assumes that "big business" is trying to preach to him and he resents it. The average manufacturer, having paid his dues to N.A.M., assumes he has fully discharged his public relations obligation for the fiscal year.

Would it not be more realistic to approach industry's public relations problem on the basis of the following assumptions?

1. The average industrialist needs education. 2. He needs it to enable him to run his company so that it will contribute most effectively to the over-all successful working of the free enterprise system. 3. The better he does his job in his own community, the higher will be the public's regard for the system as a whole and the less will be the need of "selling" it to the average citizen.

* * *

MODIFICATION LIKELY: After almost two weeks in which to ponder what business may expect from President Truman and the 81st Congress, industrial executives still are torn between fear that the new regime will swing the nation dangerously to the left and hope that conservative elements in Washington can hold this shift to a minimum.

A case in point is labor legislation. In the President's successful campaign, he promised voters that if he were elected he would work for repeal of the Taft-Hartley Act. With members of his own party holding majorities in House and Senate, it would appear that he has a fair chance to make good his promise. However, 55 members of the new Senate and 226 representatives of the new House voted for T-H in the 80th Congress. Thus there are six more pro-T-H votes in the Senate and eight more in the House than the majorities required if all members of each chamber were voting. Of course, it is possible that some congressmen who favored T-H may change their minds in view of the result of the Nov. 2 election.

On the other hand, some of the most ardent pro-labor leaders in the nation recognize the

(OVER)

fact that T-H was not as bad as indicated by many labor leaders. Taking all factors into consideration, it is likely that the new Congress may find it much easier to modify T-H than to repeal it and to write a new labor bill.

—pp. 63, 70

* * *

PROFIT TO SALES, 7%: Joint report of Securities & Exchange Commission and Federal Trade Commission affords a simple composite earnings statement for all manufacturing corporations for the second quarter of 1948.

Stated in billions of dollars, sales were 40.8, costs and expenses 36.3, profit before federal taxes 4.5, federal taxes 1.7 and net profit after taxes 2.8. Of this net, 0.9 went to stockholders in dividends and 1.9 was plowed back into the business for future needs.

While net profit after taxes for all manufacturing corporations figures out at 7 per cent of sales, this ratio varies considerably with size of establishments. For instance, companies with assets under $250,000 showed a profits-to-sales percentage of 3.6, whereas companies having assets over $100 million reported net profit equal to 8.1 per cent of sales. Compared with first quarter earnings statements, the net-to-sales ratio of small companies in the second quarter was up sharply, while that of large corporations was down moderately. —p. 65

* * *

POWER NEEDS SOARING: Market research men of Westinghouse Electric Corp. have been studying the electric power requirements of the nation over the next decade. They conclude that the number of residential power customers will increase from 29.3 million in 1947 to 34 million in 1957. During the same period, greater use of electrical appliances will raise the annual consumption per customer from 1389 to 2400 kilowatt-hours in cities and from 2351 to 4000 kilowatt-hours on farms.

These and other needs will necessitate an increase in generating capacity from 52 million kilowatts at the end of 1947 to 95 million in 1957. By 1957 sales of electricity will amount to 374 billion kilowatt hours and the total electrical machinery market will be $11.2 billion annually, as compared with $7.3 billion in 1947. Figures of this magnitude mean much to the iron, steel and metalworking industries in the form of materials, parts and equipment, not only for the generation and distribution of electricity, but more particularly for the diversified appliances which consume it. —p. 75

* * *

BUYERS CAN BE RIGHT: An interesting point in regard to customer reaction is being discussed in automotive circles. Many motor car manufacturers spend freely to find out what the customer wants. Experience in this kind of research has convinced some automobile builders that the man in the street doesn't know what he wants. As one spokesman put it, automobile designs are developed by engineers and stylists and "the public follows like sheep the dictates of the creative men."

Perhaps this is true. It is true of women's fashions and of many other consumer items which involve style and taste. It is particularly true in a sellers' market.

Will it be equally true of factors such as price and economy in a buyers' market? The customer yields to the stylist on body lines, but when he is in the driver's seat in a competitive market, his ideas about miles per gallon, "extras," trade-in allowances, price and some other factors will carry considerable weight. —p. 77

* * *

POLISHING STAINLESS: Electrolytic polishing of stainless steels is making rapid strides as a production technique in products-finishing. Today it is being employed on more than 65 different types of products, parts and assemblies fabricated from stainless steel, such as automotive hardware, household utensils, plumbing fittings, lighting fixtures, instrument panels, fish lures and dental instruments.

Electropolishing is the reverse of electroplating in that flow of current removes metal from the work instead of depositing metal upon it. Metal loss is low, usually from 0.0002 to 0.001-inch, and results in a highly polished surface and certain other important advantages. The process is designed to supplement rather than to replace mechanical polishing procedures. It is particularly effective where two-tone decorative designs are desired. —p. 109

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

LABOR LAW— New legislation governing relations between labor and management will be one of the first orders of business for the Democratic 81st Congress (p. 63). The administration, backed by the major labor unions, will advocate outright repeal of the Taft-Hartley Act. However, the new Congress will have a majority of members in each house who voted for T-H in the previous Congress. While some modifications in favor of the unions may be expected, it is unlikely that any new law passed will be as extremely pro-union as the Wagner Act of Roosevelt days.

PRICING—Efforts to clarify existing confusion over the legality or illegality of pricing methods currently in use will be continued (p. 64) when the Senate of the 81st Congress is reorganized by the Democrats. Sen. Edwin C. Johnson, who will succeed Sen. Homer E. Capehart as head of the Trade Policies Subcommittee, made this pledge last week as the committee opened hearings on the pricing muddle.

RECORDS—October steel ingot output (p. 67) reached a new alltime peak at 7,973,416 net tons, exceeding the previous peak, in March, 1944, by more than 147,000 tons. Production during the first half of November has continued to edge upward, indicating annual output of more than 88 million tons, easily a peacetime record and close to the wartime high of 89.6 million tons in 1944. The loss of 1.6 million tons of production due to stoppages in the soft coal mines precludes a new alltime yearly record.

WHO DECIDES ON STYLING?— Although auto builders spend a lot of time and money on research to find out what the public wants, or thinks it wants, new models are the creation of the manufacturers' own designers and engineers, who, of course, keep close tab on what competitors are offering. Auto company researchers (p. 77) often doubt that the public knows what kind of a car it wants to buy. Opinion polls may indicate a preference for a stripped down model, but the buyers will go for lots of chrome on rakish lines.

POWER MARKET—A 50 per cent increase in the electric machinery market in 1957 over 1947 is predicted by a large electric equipment manufacturer (p. 75) on the basis of market research studies. Generating capacity will increase from 52 million kilowatts to 95 million kilowatts; machinery sales will jump from $7.3 billion to $11.2 billion.

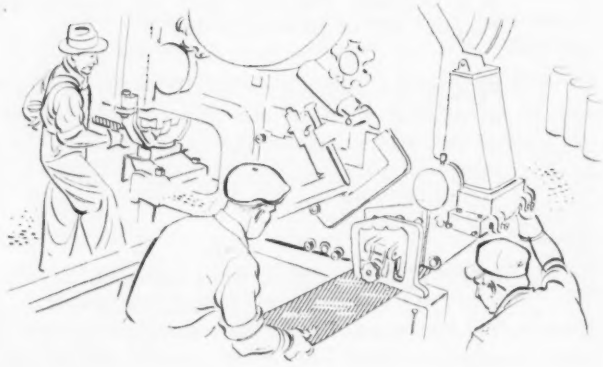
EUROPEAN RECOVERY— Progress in the reconstruction and rehabilitation of Europe continues unevenly (p. 73), with some countries, notably Belgium, Luxemburg and Britain, making rapid strides forward, and others, notably France, faltering. Western Germany is making good progress within the limitations of its program. Norway proposes to rebuild her merchant and fishing fleets, rehabilitate mining industries, and mechanize agriculture, with ECA aid.

FREIGHT CAR ORDERS UP— New orders for freight cars, which in September dropped to the lowest level since the war, rebounded sharply in October (p. 69) with 11,431 cars placed. Railroad shops were awarded the lion's share, with 9515 cars against 1916 for the commercial shops. The growing shortage of gondola cars is reflected in October orders, with 6635 cars of this type ordered. Deliveries of new cars in October totaled 8934. Backlog of orders totals 111,405.

HERE AND THERE IN INDUSTRY— Briggs Mfg. Co. is reported seeking an automobile body stamping plant site in the Pittsburgh district (p. 65) . . . Ordnance and military uses (p. 66) are requiring a greater percentage of steel output . . . Metal toy makers (p. 80) look forward to a good year . . . Republic Steel (p. 80) has been awarded a 10-year lease on the government-owned blast furnace at Gadsden, Ala . . . Nash-Kelvinator (p. 78) has started assemblies in its new auto plant in El Segundo, Calif . . . Ordnance mobilization will be directed by Maj. Gen. Charles T. Harris Jr., who leaves Hupp Corp. to join the National Security Resources Board (p. 70) . . . Fiat Automobile Co. of Italy is buying (p. 74) tools, dies and jigs in this country.

Engineering News, p. 91 *Market Summary, p. 163*

"I like the UNIFORMITY of Inland Steel"



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Labor Law Modification Seen

Administration to attempt to fulfill campaign pledges for Taft-Hartley repeal, but majority in new Congress voted for bill. Compromise is probable

HIGH on the agenda of the 81st Congress will be consideration of new labor-management relations legislation.

The Truman administration will attempt to make good on its campaign pledge to repeal the Taft-Hartley Act. Administration aides, notably Secretary of Labor Maurice J. Tobin, already are drafting replacement proposals to be submitted to the Congress in the President's state of the union message.

That the present law will be altered, few will doubt, after studying the election results, the sustained drive by union leaders to cash in on their campaign efforts, and the post-election wavering of some congressmen who voted for the Taft-Hartley Act in the 80th Congress.

How Much Change?—The question to be decided is the extent to which the present law will be changed. The membership of the 81st Congress does not presage easy adoption of an all-out pro-labor law.

Both the House and the Senate in the 81st Congress will have majorities of members who voted for the Taft-Hartley law. Fifty-five members of the new Senate are on record for T-H. This is six more votes than the necessary majority when all 96 members vote. The House will have 226 members who favored T-H in the 80th Congress, or eight more than the needed majority. These majorities, of course, may not hold up in the face of the recent election returns; a few who voted for T-H now indicate they will vote for repeal or amendment.

Still to be determined is the attitude of the more than 100 new members of Congress elected two weeks ago. A considerable number of these won with labor backing and presumably will go along with the administration's drive for outright repeal.

Division Will Be Close—Many observers expect the new legislation will be moderate. Many provisions of the Taft-Hartley Act will be retained and are, in fact, beneficial to labor.

Elimination of the Taft-Hartley name on a labor-management relations act would eliminate many of the objections of labor to the present bill. Union leaders have built up the "hateful Taft-Hartley Act" as a "slave labor law" for political rallying purposes. Provisions considered beneficial to organized labor in all probability will be retained in whatever new legislation is passed.

Considered probable is a compromise somewhere between the Taft-Hartley Act and the old Wagner Act.

May Drop Closed Shop Ban—One provision of the present law which may be dropped is the prohibition on the closed shop. The election requirement for union shop provisions also may be dropped. This has been an expensive provision of T-H and in 98 per cent of elections held, workers have voted for the union shop.

Requirement for non-Communist oaths may be retained and extended to employers as well as union officers.

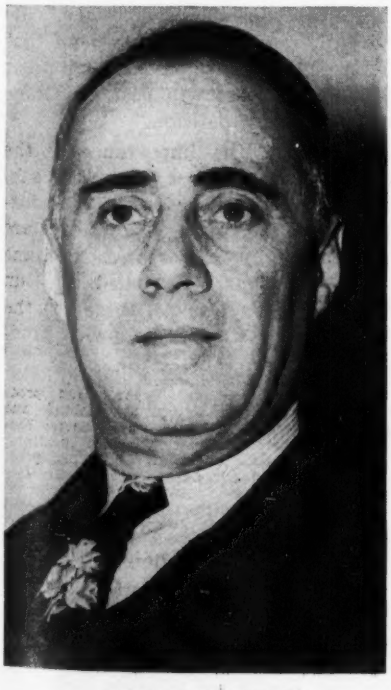
Secretary Tobin favors bringing the Federal Mediation & Conciliation Service back into the Department of Labor. The T-H Act made it an independent agency.

Mr. Tobin also favors retention of a cooling off period in labor disputes threatening the national health and welfare. This is provided in the present law by injunction.

Pro-Labor Administration — Perhaps more important than the actual provisions of the new law will be the fact that what legislation is passed will have a pro-labor administration. The Truman "New Deal" will have the government departments and agencies, presumably the Congress, and the Supreme Court in its corner. Pro-labor interpretations of the law may be expected.

Unions Press Other Aims—Labor chieftains lost little time in reminding the President of the part they played in his re-election and to insist that the planks in his platform be translated into action.

In addition to new labor-management legislation, the unions are calling for a government-sponsored housing program, high minimum wages, vastly-expanded social security, health insurance programs, and federal aid to education and anti-inflation legislation.



JOHN M. HOUSTON

Houston May Keep NLRB Post

REAPPOINTMENT of John M. Houston to the National Labor Re-

MAURICE J. TOBIN

lations Board to maintain a three-to-two New Deal majority on the board is expected in Washington. Houston's reappointment was blocked by the Republican Senate at the last session, in anticipation of a change in the national administration. President Truman, it is reported, will submit his name to the Democratic 81st Senate.

Mr. Houston, with Chairman Paul Herzog and former Senator Abe Murdock of Utah, make up the so-called New Deal majority. James J. Reynolds Jr. and J. Copeland Gray are the minority members.

Two States Vote Closed Shop

CLOSED shop bans were rejected by voters in Massachusetts and New Mexico in the Nov. 2 election. These labor victories were partially offset in Arizona where a prohibition of closed shop contracts was upheld.

Most complete state election victory was won by the unions this year in Massachusetts where they defeated: 1. A "right to work" measure; 2. requirement that union officials be elected by secret ballot at least once a year; 3. a ban on strikes except where voted by a majority of the union's membership.

Steel Payrolls Set Record

MONTHLY payroll of the iron and steel industry set a new record at almost $200 million in September, with average hourly earnings continuing their recent rapid rise.

Earnings of hourly, piecework and tonnage workers in September averaged $1.718, compared with $1.689 in August and $1.645 in July. The average for the first half of 1948 was $1.562.

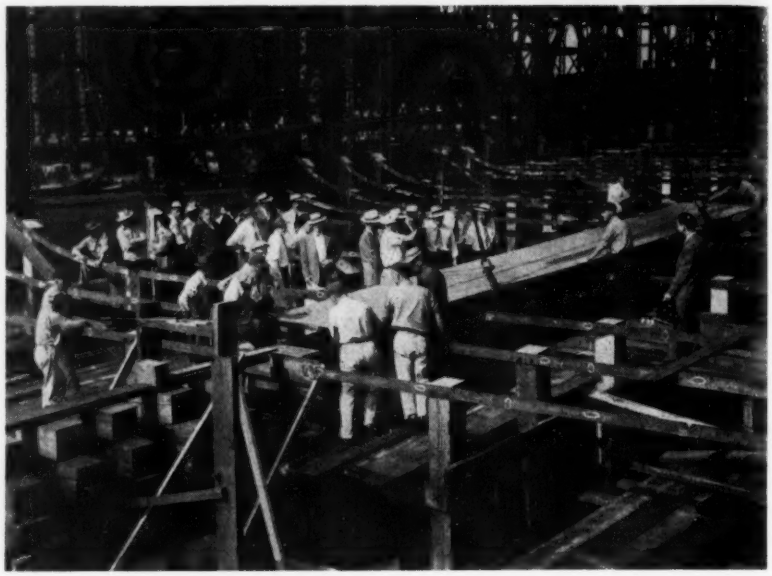
Estimated total employment in the industry in September was 640,700.

Average work-week of wage earners rose to 40.1 hours, highest since March when it was 40.6 hours.

The September payroll of $199,440,000 compared with $193,800,000 in August and was 18 per cent higher than a year ago. For the first nine months, the industry's payroll totaled $1,627,145,000. This sum is nearly equal to the payroll for all of 1943 and higher than any prior full year.

Producing Conversion Ingot

THE Detroit Steel Casting Co., Detroit, a subsidiary of the Barium Steel Corp., New York, has temporarily discontinued the manufacture of steel castings. The company's furnaces are producing basic steel ingots for conversion into rolled steel products.



SHIPBUILDING ON UPGRADE: Keels are down for four supertankers for the Texas Co. at the Fore River, Mass., yard of Bethlehem Steel Co., sparking an upturn in shipbuilding activity in New England. Workmen are shown laying the keel for one of the oil carriers in photo above

Democrats To Push Pricing Study

Reorganization of Senate in 81st Congress not to bring letdown in effort to eliminate confusion due to basing point decisions. Capehart hearing opens

WHEN the Democrats reorganize the Senate on Jan. 3, there will be no letdown in the effort to eliminate existing confusion over the legality or illegality of pricing methods presently in use.

This assurance was conveyed at the opening hearing last week, of the Trade Policies Subcommittee, Senate Interstate & Foreign Commerce Committee, by a letter from Sen. Edwin C. Johnson (Dem., Colo.), who will become chairman of the subcommittee in place of the present chairman, Sen. Homer E. Capehart (Rep., Ind.).

Senator Johnson commended Senator Capehart for his efforts to clear up the present confusion about pricing methods, and urged that the study be pushed vigorously to the end that any needed legislation might be approved by the 81st Congress.

McMahon Sympathetic—Of further significance was the attitude of Sen. Brien McMahon (Dem., Conn.) who, by the nature of his questions and comments, indicated full sympathy with the subcommittee's objective as shaped under Senator Capehart.

Committee Obligation—The obligation of the subcommittee at this time, said Senator Capehart, is "to conduct a study to determine whether sellers should lawfully be permitted to adopt uniform delivered prices, uniform zone prices, and pricing practices involving the absorption of freight to meet the lower price of a competitor located closer to the customer, whenever such practices are individually and separately employed in the absence of a conspiracy." He added: "As a preliminary to that determination, we must find what pricing practices will best encourage and foster competition."

To reflect the importance of the issue in our entire economy, the subcommittee introduced a list of industries whose pricing practices are challenged by the recent Supreme Court decisions. Compiled by Dun & Bradstreet's *Review*, these are the industries making the following products:

Anti-friction bearings; apparel and products made from fabrics; automobiles and equipment, except electrical; auto parts; beverages; builders' supplies; business furniture; cadmium; cement; chemicals and allied products; china and porcelain; coal; construction machinery; cordage; cotton manufactures.

Electrical machinery and equipment; end-grain strip wood block; farm equipment; flour; food and kindred products; glass containers; grocery products; ice; iron, steel, and products.

Ladders; leather and products; liquefied gas; lime; lumber and timber basic products; lye; machinery, except electrical and transportation equipment; nonferrous metals and their products; paper, pulp, and allied products; paint and varnish; petroleum and coal products; printing and publishing industries.

Reinforcing materials; road machinery; rub-

ber and rubber products; soft fiber; soil pipe; structural clay products; stone, clay, and glass products; textile and mill products except cotton; tobacco manufacturers; transportation equipment except automobiles; vitrified clay sewer pipe; wholesale coal; wholesale food and groceries; zinc.

Some 60 to 70 witnesses are slated to appear before the subcommittee during the present series of hearings, and many more probably will be called for a second series to be held in late November or December. Included are spokesmen for companies in many lines of industry, small and large, and various others, as economists, labor leaders and bankers.

Cites Competition—William Schoenberg, general president, United Cement, Lime & Gypsum Workers International Union—AFL, an early witness said when demand for cement slows down and competition again determines who gets the business — when as small a price differential as 5 cents per bbl will swing the order to the lower-priced producer—the cement plants with lowest freight rates to consuming centers will enjoy local monopolies, while the cement plants more distantly located will have to move to more favorable locations.

Difficult problems, he said, are involved, as cement plants have been located close to the source of their raw materials.

Mr. Schoenberg will submit to the subcommittee within two weeks a map showing the small cities and towns which would have to be abandoned in whole or in part in the course of time if outlawing of delivered prices in the cement industry is allowed to stick.

An analysis of the issue as seen through the eyes of an investment banker was conveyed to the subcommittee by John M. Hancock, New York.

Huge Investment Affected—He said the decisions outlawing basing point and similar pricing affect industries representing an aggregate of over $50 billion of American investment, employing approximately 16 million with factories located in every state in the union.

Because of the detailed impact of the questions involved upon all business, the answers which Congress will provide will measurably control the venturing of risk capital in new enterprises, Mr. Hancock said, insisting that above all the boundaries which are marked out on the freedom to compete will become important sign posts either to continued democratic freedom or to economic statism.

Clearing the air of foggy economic theories, composed of vague, uncertain, and changing rules to control the conduct of the individual businessman, will have a salutary effect upon American enterprise, he said, in conclusion, declaring that it will foster real competition, encourage new investment, make more and better jobs, and preserve the nation's industrial strength.

Small Business—Speaking for small business, DeWitt Emery, Chicago, president, National Small Business Men's Association, urged that Congress curb the authority of the Federal Trade Commission, holding that it had moved in 100 different ways on 1000 different fronts to destroy freedom of enterprise.

"If the basing point method of pricing has been abused by one industry or another," said Mr. Emery, "those things should be corrected. But it isn't necessary to kill or destroy the whole pricing system in order to correct these abuses."

Mr. Emery submitted to the subcommittee a lengthy exhibit of quotations from 110 small businesses scattered over 19 states, representing 77 different categories of business including various kinds of manufacturers, steel fabricators, wholesalers, lumber yards, etc. He felt this exhibit provided a good cross-section of opinion, reflecting the far-reaching detrimental effect on small business of the ban on basing point and similar pricing practices.

Briggs Seeks Pittsburgh Site

BRIGGS Mfg. Co., Detroit, principal supplier of automobile bodies to Chrysler Corp. divisions, is reported seeking an automobile body stampings plant site in the Pittsburgh district to be closer to its major steel suppliers. Much of its steel supply is said to come from the Pittsburgh, Weirton and Wheeling districts.

Kelsey-Hayes Wheel Co. had previously purchased the McKeesport, Pa., plant from Jones & Laughlin Steel Corp. (STEEL, Aug. 2, p. 58) and Fisher Body Division, General Motors Corp., has announced plans for establishing blanking and stamping plants in the Pittsburgh area (STEEL, Nov. 1, p. 50). Move of Briggs into the district, therefore, would mark the entry of the third major Detroit automotive firm into the Pittsburgh district since the steel industry abandoned the basing point system of pricing.

Briggs representatives are understood to have made two trips to the Pittsburgh district in recent weeks to inspect sites and plan to return this week. Reports that Briggs is seeking commitments of about 20,000 tons of steel monthly indicate a large plant is planned.

Industry Income Holds

Net for all manufacturing corporations in second quarter at about same rate as in first

NET INCOME after taxes of all U. S. manufacturing corporations is estimated at $2.8 billion in the second quarter, 1948, according to the joint quarterly report of the Securities & Exchange Commission and the Federal Trade Commission.

The rate of profit was at approximately the same level as in the first quarter, and was about $350 million above the same quarter.

Total sales of all manufacturing corporations for the three months are estimated at $40.8 billion, an increase of $800 million over the preceding quarter, while costs and expenses amounted to $36.3 billion, an increase of $900 million. Net profits before federal income taxes amounted to $4.5 billion; federal income taxes were estimated at $1.7 billion for the second quarter. Over $900 million was paid out in dividends resulting in retained corporate profits of $1.9 billion for the quarter.

Net Property Up—Total assets of all manufacturing corporations were estimated at $103.2 billion and stockholders' equity at $71.7 billion at the end of June, 1948. Of total assets, about $28.0 billion was in the form of inventories while $38.6 billion represented net working capital. The net property, plant and equipment of all manufacturing corporations rose by $2.0 billion and amounted to $35.8 billion at the end of June.

As shown by the report, rates of profit, both in relation to investment and to sales, were slightly lower than in the first quarter of 1948. This was true for nearly all the industry groups with manufacturing of stone, clay and glass products and rubber products as the notable exceptions.

As regards the different size classes of corporations, the most striking comparison is the increase in profits exhibited by the smallest size group. The rate of return after taxes per dollar of sales rose from 2.0 per cent to 3.6 per cent for companies under $250 thousand in assets while it dropped from 8.7 per cent to 8.1 per cent for the large corporations with assets over $100 million. Medium sized corporations maintained the same rate as in the prior quarters.

For all manufacturing companies the ratio of profits after taxes to sales dropped from 7.2 per cent during the first quarter to 7.0 per cent during the second quarter of this year.

More Steel for Defense

Military's August tonnage gains. Warehouse receipts fall; auto industry remains heaviest user

STEP-UP in preparedness activities late last summer is reflected in a jump in steel shipments for ordnance and military uses.

The American Iron & Steel Institute's August distribution report, released last week, shows ordnance and other military uses received 17,102 net tons of steel that month, only 51 tons less than the entire amount that group received in the preceding seven months.

Bulk of the August tonnage was carbon steel. Principal products and their tonnages were structural shapes 7190, plates 4216, piling 1350, and hot-rolled bars 1257.

Mill Shipments Up—Although total mill shipments of steel in August rose to 5,329,060 tons, that month was the poorest of the year for jobbers, dealers and distributors, their receipts totaling 869,448 tons. Also getting less in August than in any of the preceding seven months was the farm classification with 95,168 tons.

On the other hand, appliances, utensils and cutlery got a larger tonnage than in any of the first seven months of the year. This group's August receipts totaled 195,910 tons.

Auto Industry Leads—The automotive industry continued in August the largest consumer of steel, its shipments from mills aggregating 820,493 tons. Next three largest consumers were construction and maintenance, which took 612,509 tons; containers, 458,253 tons; and rail transportation, 443,373 tons. In the construction classification almost a third of the tonnage went to the oil and gas industry, its receipts totaling 189,817 tons, the bulk being line pipe and plate. Of the rail transportation's receipts, 233,724 tons were for freight cars.

Biggest consumer of alloy and stainless steels in August was the automotive industry.

Finished Steel Shipments Rise

NET SHIPMENTS of steel products increased sharply during September to 5,511,474 tons from 5,329,060 tons in the preceding month and compared with 5,118,839 tons in September, 1947, according to the American Iron & Steel Institute. This was the second largest total for the year to date, having been exceeded only by the 5,978,551 tons shipped in March.

In addition to these net shipments, the movement of products to members of the industry for conversion to further finished products or for resale amounted to 569,570 tons in September compared with 591,317 tons in August.

For the first nine months, total net shipments came to 48,288,449 tons compared with 46,620,218 tons in the like 1947 period, while shipments to members of the industry for conversion during the same periods were 5,038,257 and 4,038,833 tons, respectively.

Product Mix—The product mix has shown only negligible changes from month to month this year, the largest change during September having been an increase of 0.6 per cent in the ratio of hot-rolled bar shipments to the total. Hot-rolled bar shipments amounted to 817,751 tons

DISTRIBUTION OF STEEL PRODUCTS FOR SEPTEMBER AND YEAR TO DATE

Steel Products	Number of companies	Items	SEPTEMBER - 1948			To Date This Year			Whole Year 1947		
			Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	45	1	274,586	5.0	285,287	2,285,998	4.7	2,433,885	2,966,748	4.7	2,396,343
Structural shapes (heavy)	12	2	333,533	6.1	1,926	3,101,452	6.4	19,023	4,436,129	7.0	2,640
Steel piling	4	3	23,814	0.4	98	220,119	0.5	1,204	324,224	0.5	23
Plates (sheared and universal)	29	4	572,075	10.4	26,871	5,071,600	10.5	276,530	6,345,216	10.1	219,227
Skelp	6	5	10,127	0.2	34,926	110,414	0.2	319,741	150,989	0.3	384,004
Rails—Standard (over 60 lbs.)	4	6	166,311	3.0	820	1,456,863	3.0	9,341	2,207,146	3.5	991
—All other	5	7	17,504	0.3	21	154,472	0.4	943	211,900	0.3	389
Joint bars	7	8	10,992	0.2	4,248	102,610	0.2	30,909	173,923	0.3	15,198
Tie plates	7	9	39,824	0.7	15	370,342	0.8	337	504,779	0.8	4,437
Track spikes	8	10	13,238	0.3	34	105,834	0.2	558	163,746	0.3	146
Hot Rolled Bars—Carbon	34	11	523,255	9.5	45,748	4,570,279	9.5	454,717	6,242,416	9.9	745,770
—Reinforcing—New billet	16	12	111,211	2.0	328	987,149	2.0	4,880	1,277,075	2.0	9,775
—Rerolled	13	13	17,352	0.3	-	157,450	0.3	-	175,833	0.3	-
—Alloy	27	14	165,933	3.0	18,555	1,396,782	2.9	159,244	1,741,432	2.8	212,382
—Total	44	15	817,751	14.8	64,631	7,111,660	14.7	628,841	9,436,756	15.0	967,927
Cold Finished Bars—Carbon	28	16	112,697	2.1	544	977,614	2.0	4,756	1,426,701	2.3	9,249
—Alloy	27	17	22,422	0.4	894	169,725	0.4	5,401	218,802	0.3	2,601
—Total	35	18	135,119	2.5	1,438	1,147,339	2.4	10,157	1,645,503	2.6	11,850
Tool steel bars	18	19	7,957	0.1	26	64,826	0.1	1,321	87,279	0.1	1,670
Pipe & Tubes—Butt weld	15	20	182,378	3.3	3,053	1,475,735	3.1	20,911	1,892,691	3.0	78,080
—Lap weld	8	21	28,794	0.5	-	251,583	0.5	3	389,762	0.6	875
—Electric weld	13	22	139,327	2.5	564	1,143,726	2.4	3,838	1,254,325	2.0	4,274
—Seamless	17	23	232,667	4.2	16,915	2,121,767	4.4	127,332	2,581,106	4.1	157,208
Wire rods	21	24	46,024	0.8	23,148	449,514	0.9	231,350	667,282	1.1	331,192
Wire—Drawn	39	25	225,671	4.1	15,116	1,962,031	4.1	132,022	2,590,963	4.1	181,783
—Nails and staples	17	26	71,860	1.3	809	638,818	1.3	9,672	799,436	1.3	8,481
—Barbed and twisted	15	27	20,921	0.4	1	189,824	0.4	400	256,991	0.4	128
—Woven wire fence	13	28	33,504	0.6	432	298,331	0.6	2,831	407,295	0.6	3,616
—Bale ties	11	29	9,685	0.2	-	89,951	0.2	-	119,917	0.2	-
Black Plate—Ordinary	9	30	66,879	1.2	-	595,555	1.2	654	801,745	1.3	2,033
—Chemically treated	2	31	1,058	-	-	10,563	-	-	19,252	-	-
Tin and Terne Plate—Hot dipped	8	32	190,533	3.5	49	1,583,393	3.3	259	2,093,149	3.3	228
—Electrolytic	9	33	143,661	2.5	-	1,303,861	2.7	215	1,617,659	2.6	529
Sheets—Hot rolled	32	34	638,880	11.6	48,485	5,721,164	11.9	470,915	7,891,798	12.5	578,426
—Cold rolled	16	35	578,355	10.5	1,584	5,002,596	10.4	15,378	5,504,578	8.7	28,498
—Galvanized	16	36	142,967	2.6	155	1,216,285	2.5	2,136	1,609,881	2.5	889
Strip—Hot rolled	23	37	141,034	2.6	36,479	1,220,510	2.5	268,108	1,740,085	2.7	308,655
—Cold rolled	34	38	149,529	2.7	2,271	1,301,076	2.7	18,445	1,613,005	2.6	28,030
Wheels (car, rolled steel)	5	39	26,273	0.5	155	243,388	0.5	881	356,873	0.6	2
Axles	5	40	18,643	0.3	13	155,249	0.3	116	185,019	0.3	53
All other	-	41	-	-	-	-	-	-	-	-	-
TOTAL STEEL PRODUCTS	140	42	5,511,474	100.0	569,570	48,288,449	100.0	5,038,257	63,057,150	100.0	5,717,765

* Adjusted.

in September compared with 755,971 tons in August, accounting for 14.8 per cent against 14.2 per cent of total shipments.

October Steel Output Soars

More metal produced in October than in any previous month in history, at nearly 8 million tons

PRODUCTION of steel in 1948 will exceed 88 million tons which would establish a new peacetime high and would be exceeded only by the wartime records of 89,641,600 tons reached in 1944 and 88,836,512 in 1943.

Production of ingots and steel for castings during the week ended Nov. 13 was scheduled at 1,791,700 tons, higher than ever before in the history of the industry. The scheduled tonnage is 400 tons larger than the all-time weekly record of 1,791,300 tons in the wartime week of Apr. 24, 1944.

The current record operations extend the showing the industry made in October when more steel was produced than in any previous month during war or peace, the American Iron & Steel Institute announced. Production during that month totaled 7,973,416 net tons, exceeding the previous peak in March, 1944, by more than 147,000 tons.

Output of steel in 10 months of 1948 was 72,960,936 tons, nearly 2,700,000 tons more than in the similar period of 1947, record peacetime production year, and only 3 per cent lower than output in 10 months of 1944, year of greatest steel production.

Steelmaking furnaces were operated at an average of 99.9 per cent of ingot capacity in October, highest operating rate since October, 1943. In September, the rate was 96.1 per cent and the average for nine months was 92.1 per cent. Open-hearth and electric furnaces were each operated at slightly above rated capacity.

Steel Ingot Production Statistics

	Estimated Production—All Companies									
	—Open Hearth—		—Bessemer—		—Electric—		—Total—		Calculated	Number
	Net tons	Per cent of capac.	Net tons	Per cent of capac.	Net tons	Per cent of capac.	Net tons	Per cent of capac.	weekly production Net tons	of weeks in mo.
1947										
1st 6 mos.	38,328,096	95.4	2,177,701	85.2	1,832,760	72.8	42,338,557	93.5	1,636,589	25.87
2nd 6 mos.	38,545,697	94.4	2,054,842	79.1	1,954,975	76.4	42,555,514	92.6	1,619,928	26.27
Total	76,873,793	94.9	4,232,543	82.1	3,787,735	74.6	84,894,071	93.0	1,628,195	52.14
1948										
Jan.	6,768,497	95.5	343,169	77.5	361,110	79.0	7,472,776	93.6	1,686,857	4.48
Feb.	6,245,338	94.3	340,596	82.3	354,270	82.9	6,940,204	93.0	1,676,378	4.14
Mar.	6,841,578	96.6	363,235	82.0	403,322	88.2	7,608,135	95.3	1,717,412	4.43
1st qtr.	19,855,413	95.5	1,047,000	80.6	1,118,702	83.4	22,021,115	94.0	1,693,932	13.00
Apr.	5,640,168	82.2	185,089	43.2	392,900	88.7	6,218,157	80.4	1,449,454	4.29
May	6,799,289	96.0	355,562	80.3	416,501	91.1	7,571,652	94.8	1,709,177	4.43
June	6,481,879	94.5	356,810	83.2	417,665	94.3	7,256,354	93.8	1,691,458	4.29
2nd qtr.	18,921,336	90.9	897,461	69.0	1,227,366	91.4	21,046,163	89.7	1,617,691	13.01
1st 6 mos.	38,776,749	93.2	1,944,461	74.8	2,346,068	87.4	43,067,278	91.9	1,655,797	26.01
*July	6,346,423	89.8	324,991	73.6	395,610	86.7	7,067,024	88.7	1,598,874	4.42
Aug.	6,631,157	93.6	371,205	83.8	435,246	95.2	7,437,608	93.1	1,678,918	4.43
*Sept.	6,592,226	96.3	387,153	90.5	436,231	98.7	7,415,610	96.1	1,732,619	4.28
*3rd qtr.	19,569,806	93.2	1,083,349	82.5	1,267,087	93.5	21,920,242	92.6	1,669,478	13.13
*9 mos.	58,346,555	93.2	3,027,810	77.4	3,613,155	89.4	64,987,520	92.1	1,660,386	39.14
†Oct.	7,099,532	100.2	409,545	92.5	464,339	101.5	7,973,416	99.9	1,799,868	4.43

* Revised. † Preliminary figures subject to revision.

Set Steel Allocation Hearings

PUBLIC hearings on proposed continuation beyond Feb. 28, 1949, of three voluntary steel allocation plans now in effect under Public Law 395 will be held in the Department of Commerce auditorium, Washington, Nov. 15.

The three public hearings, and the amounts of steel products involved in each is as follows: Steel Products for the Armed Forces, 102,505 tons monthly, same as at present; United States Atomic Energy Commission Projects, 16,244 tons monthly, reduction from the present 20,000 ton rate; the National Advisory Committee for Aeronautics, 1926 tons monthly, same as the present rate.

The steel industry has agreed to continue to provide steel products for the three programs beyond Feb. 28, 1949, but the public hearings are being held so that industry, labor and the public can express their views on the proposed continuation of the plans.

The Steel Products Advisory Committee will meet with government officials Nov. 19, to discuss certain proposed voluntary plans, action on which was postponed at the Oct. 6 meeting.

Sawyer Names Scrap Drive Unit

APPOINTMENT of a Scrap Drive Committee has been announced by Secretary of Commerce Charles Sawyer, to assist the Office of Industry Cooperation in building up winter supplies.

Committee is composed of leading trade association executives representing industries which are potential sources of large amounts of obsolete iron and steel machinery and equipment.

Sees Exports on Unsound Base

A FIRMER base must be established if American export business with Europe is to be developed to its full potential, W. A. Robertson, chairman, Westinghouse Electric Corp., Pittsburgh, told exporters at the 35th convention of the National Foreign Trade Council at the Waldorf-Astoria, New York, Nov. 8-10.

"As long as the United States continues to furnish taxpayers' money for the purchase of material for Europe's use, there will be a market for American goods. But this is a shortlived stimulant. Some better and more lasting cure must be found."

Probe of Lease Postponed

CONGRESSIONAL investigation of Kaiser-Frazer Corp.'s lease of the government-owned Cleveland blast furnace has been postponed indefinitely. The probe, conducted by a House executive expenditures subcommittee, was to have been reopened last week. Postponement, it was said, was necessitated by inability of several committee members to attend.

Floor Truck Builders Meet

PROGRESS toward possible adoption of standards to govern general specifications of caster and floor truck handling equipment was reported at the recent annual meeting of the Caster & Floor Truck Mfrs. Association in Cleveland. The meeting was well attended and a busy year was reported in prospect for the association, including participation in the national exposition to be held in Philadelphia during January, 1949.

Officers elected at the meeting were: President, A. B. Morris, Nutting Truck & Caster Co.; vice president, C. Carter Bond, Bond Foundry & Machine Co.; treasurer, A. B. Anderson, Nagle Chase Mfg. Co.; secretary, H. P. Nolan, Chicago.

The board of directors is as follows: W. G. Reycroft, The Bassick Co.; L. C. Conner, Orangeville Mfg. Co.; K. P. Norton, Case, Crane, Kilbourne & Jacobs Co.; J. N. Robbins, American Pulley Co.; J. Stefan Jr., Electric Wheel Co.; and Mr. Bond.

Coast Scrap Men Meet

Co-operation urged at Seattle conference. Area's scrap needs up sharply from prewar

CLOSE co-operation between scrap dealers and buyers was urged by H. E. Christensen, director of purchases, Columbia Steel Co., San Francisco, speaking at the Pacific Coast Conference, Institute of Scrap Iron & Steel held at Seattle, Nov. 1 and 2.

The Pacific Coast, he said, has been scrap rich and the further growth of the area and its industries will depend to a large extent on the supply of scrap. Annual potential production of finished steel in the western states, he pointed out, is now 3 million tons compared with 900,000 before the war. In 1938-40 the supply of scrap in the western area was 785,000 tons annually, but 1949 requirements will be 2,394,000 tons.

More Production—Speaking on the problems and opportunities of new Pacific Coast markets, Philip M. Crawford, regional director, Department of Commerce, stressed the need for greater steel production and explored the various sources of scrap, which, he added, is used in greater volume in the western area in proportion to output than elsewhere.

Among those attending the meeting were Herman D. Moskowitz, national president, and E. C. Barringer, institute executive vice president.

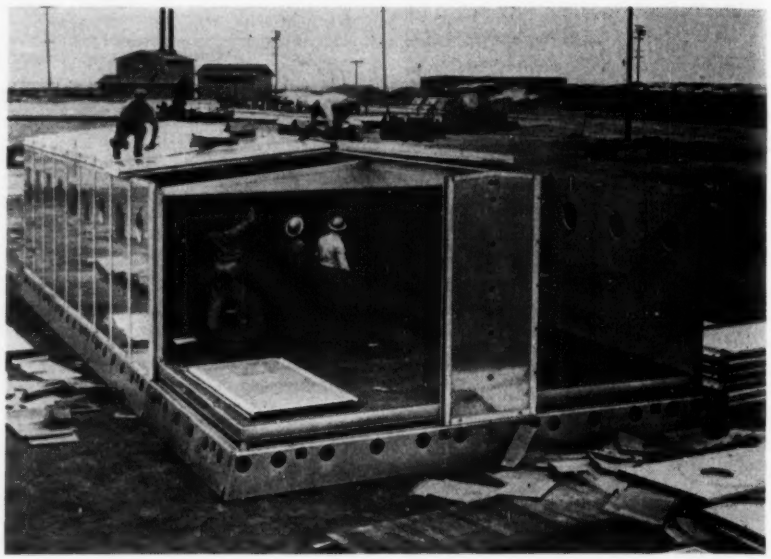
Predicts Shortage—In the general discussion, Harry Schwartz, Alaska Junk Co., Seattle, predicted an increasing shortage of scrap along the Pacific Coast.

New officers for 1949 of the Pacific Northwest Chapter of the institute were installed as follows: President, Leo Bloch; first vice president, Carl Sternoff; second vice president, Gilbert Rosenwald Jr.; secretary, David M. Sidell; treasurer, Harry Sidell.

Columbia's New Capacity Outlined

BREAKDOWN of the 325,000-ton annual production at Columbia Steel Co.'s new Pittsburg, Calif., tin plate and sheet mill is roughly 200,000 tons of tin plate and 125,000 tons of sheet, J. Lester Perry, retiring president, told touring representatives recently of the San Francisco Stock Exchange. Tin plate production will be channeled into the San Francisco Bay area.

He disclosed that U. S. Steel subsidiaries now account for about 2 million tons of the 3,500,000-ton ingot capacity in the seven Western States.



ARCTIC BARRACKS: This prefabricated structure, designed to withstand 150-mile-an-hour gales, support 13 feet of snow on its roof, and provide comfortable shelter at 65 degrees below zero, will be used by the Navy to house Seabees at Point Barrow, Alaska. NEA photo

Materials Handlers Get a Lift

Westinghouse is host to over 100 engineers and executives in the mechanized handling machinery industry at a two-day conference in Buffalo

MORE than 100 engineers and executives prominent in the design, manufacture and application of machines and methods for mechanized handling of materials and parts in the mass production industries, were guests of Westinghouse Electric Corp. at the Statler Hotel and the Buffalo motor plant, Nov. 8 and 9.

This second Materials Handling Machinery Manufacturers' Conference, which was patterned after the highly successful Machine Tool Electrification Forum which has been held annually since 1936, had as active participants many members of the Conveyor Equipment Manufacturers Association, whose executive secretary, R. C. Sollenberger of Washington, D. C., was chairman of the Monday morning session; Electric Hoist Association, whose chairman, H. H. Kumler, served as toastmaster of the luncheon on Monday; and Electric Overhead Crane Institute, whose president, W. W. Peattie of Detroit, served as chairman of the Monday afternoon session.

Wason Is Speaker—National Association of Manufacturers also was represented by its past president, R. R. Wason, New York, who was guest speaker at the banquet on Tuesday evening. Mr. Wason, who is president of Manning, Maxwell & Moore Corp., dealt with the inroads being made by government control and taxation into private enterprise.

He also pictured what unsound money can do to the economic future of the individual. One thing in particular which he urged was that the Marshall Plan not be continued as a kind of European WPA, but rather that it be switched at the earliest possible moment to an agency for the long-range upbuilding of foreign countries through efficient production stimulated by American capital goods—including machine tools and materials handling equipment.

In Swaddling Clothes—The foreign situation mentioned by Mr. Wason already had been touched upon by D. E. Akins, Apparatus Division manager, Westinghouse, who has just returned from extensive foreign travels. Generally speaking, he said, materials handling abroad is still "in swaddling clothes." He mentioned the "Berlin Airlift" as the greatest demonstration ever made to the Russians of American efficiency in materials handling. With labor and materials abroad now rapidly going sky-high, we are becoming "one world" economically much faster than we are politically, he said. The result is

that foreign countries will not be able to compete in foreign markets unless they practice American-type manufacturing efficiency. That opens the door for sale of American materials handling equipment and American manufacturers should try vigorously to do business along those lines under the Marshall Plan.

In a paper entitled "A User's Eye View of the Materials Handling Industry," E. L. Bailey, staff electrical engineer, Chrysler Corp., Detroit, gave an interesting exposé of how the manufacturing operations of his company are co-ordinated by materials handling apparatus to the extent that the factory is in effect one vast production and assembly machine.

Many on Program—Other speakers included: Stanley G. Smith, electrical engineer, Mathews Conveyer Co., Ellwood City, Pa., on "Continuous Flow of Materials," with emphasis on automatic "traffic control"; C. L. Moon, sales engineer, Mechanical Handling Systems, Detroit, on "Conveyors—the Arteries of Production," who drove home the point that conveyorized assembly and scientific plant management now go hand-in-hand; Sidney Buckley, president, Shepard Niles Crane & Hoist Corp., who reviewed his 51 years of experience in electrification; E. C. Rice, vice president, Whiting Corp., Harvey, Ill., who described new ideas in cab design to afford operating visibility and safety; C. Brongersma, electrical engineer, Shaw Box Crane Division, Manning, Maxwell & Moore Corp., Muskegon, Mich., who stressed the need for standardization of crane motors and controls; E. M. Hays, crane and bridge department, Dravo Corp., Pittsburgh, who analysed the safety requirements for materials handling machinery; H. G. Dillon, Heyl & Patterson Inc., and C. B. Risler, Westinghouse, who described the huge bauxite loading and unloading apparatus recently installed by Alcoa in the British West Indies; and M. P. Winther, president, Dynamatic Corp., Kenosha, Wis., who described the design and use of magnetic couplings of induction type for variable speed drives.

On Tuesday, L. R. Ludwig, manager, was host to the entire group at the Buffalo plant of Westinghouse. Technical discussions were followed by luncheon and an inspection trip. This is the largest plant in the world devoted to manufacture of electric motors and closely allied equipment. Its five miles of roller conveyors move approximately 100 million lb of material per year. The plant is so highly mechanized as far as materials handling is concerned, that—in the words of T. C. Fockler, assistant general manager—"It is difficult to detect where materials handling ends and tooling begins." This is indicative of the extent to which materials handling means now are being "built into" machine tools and other production machinery.

Freight Car Orders Jump

Substantial gain in awards noted in October compared with September

DUE TO substantial orders placed in railroad company shops, freight car awards in October jumped sharply to 11,431, according to present tentative estimates of the American Railway Car Institute, compared with 840 in September.

In other words, railroad shops booked 9515 cars, as against 1916 for the commercial shops. Total orders as of Nov. 1 were given as 85,144, against 109,283, in the corresponding period of last year.

Of special interest is the fact that 6635 gondola cars contributed to the October total. There has been an increasing shortage of this type of car for some weeks, a shortage that has been felt by the steel industry.

Order Backlog Up—Order backlogs as of Nov. 1 amounted to 111,405 cars, as compared with 108,907 a month earlier and 125,625 on Nov. 1, 1947.

Domestic freight car deliveries during October totaled 8934, against 9753 in the preceding month. Deliveries for the first ten months amounted to 93,084, against 50,040 in the same period in 1947.

Of October deliveries, 6649 were from the commercial car builders and 2285 from railroad shops, the institute reported. Production on the leading types of cars was: Box, 2888; hopper, 3112; gondola, 1536; and refrigerator, 649.

Comparative figures on domestic freight car awards follow:

	†*1948	*1947	*1946	1945	1944
Jan.	8,613	9,222	1,481	7,200	1,020
Feb.	10,698	13,724	2,328	1,750	13,240
Mar.	13,227	12,048	3,512	2,500	6,510
Apr.	16,927	9,186	3,564	1,120	4,519
May	2,229	7,389	2,900	1,526	1,952
June	5,868	12,784	3,335	670	1,150
July	11,523	14,840	14,836	3,500	795
Aug.	3,788	2,352	9,527	7,240	3,900
Sept.	840	9,917	11,102	12,840	400
Oct.	11,431	17,737	3,407	1,320	2,425
Nov.	....	8,079	6,690	1,650	1,065
Dec.	....	4,030	3,441	4,116	16,245
Total	....	121,308	66,723	45,432	53,221

* American Railway Car Institute.
† Tentative.

Crucible Expands Syracuse Unit

CRUCIBLE Steel Co. of America, New York, has virtually completed a $3,600,000 modernization and re-organization program at its Sanderson-Halcomb Works at Syracuse, N. Y.

The works now incorporates manufacturing operations formerly located at other Syracuse locations, the Sanderson plant and the Emerson Avenue unit. Included in the program is modernization and enlargement of the Syracuse master warehouse, one of three master warehouses operated by Crucible. The Sanderson-Halcomb Works, one of six Crucible manufacturing centers, produces specialty steel products and now employs more than 3000.

This project is one of the last in Crucible's $30 million, company-wide, improvement program. Thirty top officials of the organization recently viewed operations at the Syracuse Works.

Crucible Steel Co. officials inspect modernization progress at the Sanderson-Halcomb Works in Syracuse. Shown, left to right: A. A. Hassan, superintendent of Atha Works, Harrison, N. J.; W. H. Howell, general superintendent, Midland, Pa., Works; S. A. Jackson, manager, and S. A. Fronek, assistant manager, Park Works, Pittsburgh; R. A. Schneid, manager of the Syracuse plant; W. D. Gross, manager, Spaulding Works, Harrison, N. J.; R. Schempp, assistant manager, Sanderson-Halcomb Works; W. P. Snyder Jr., chairman of the board; W. H. Colvin Jr., president; and R. S. Poister, vice president

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

Truman's surprise re-election gives Washington bureaucrats and New Dealers new lease on life. Union labor leaders seen among President's chief advisers

NOTHING like the change in atmosphere since the election has been seen in Washington in many a long day. President Truman's stock had fallen to almost zero, and many of the Democrats in his administration were packing up preparatory to going back home in January. Now all that has changed; administration brass hats whooped up the President's return on Nov. 5 by lining up an estimated half a million government employees along Pennsylvania avenue to cheer him and his family on their return to the White House.

Not only are the Democrats safely in the saddle again, but veteran Roosevelt New Dealers have come out of hiding. The pledges given the voters by the Democratic platform, and the assurances given the voters during the campaign by President Truman himself that these pledges will be carried out, appear to promise these gentry a new hey-day. With a liberal public housing, a new labor law, price and other controls, and other legislation of this general type in the offing, these men should have a new lease on life.

Labor's Position Better—The labor union leaders constitute another group whose morale has been improved by the election results. They did not fare as well with the 80th Republican Congress as they would have liked. Enactment of the Taft-Hartley Act was a body blow to their pride. With few exceptions (John L. Lewis the chief one) they plugged for Truman in the face of universal expectations of a Dewey victory. Now it is clear that labor leaders will be among the President's chief advisers over the next four years. In fact, Truman's coming term is expected to take on some of the aspects of a labor government for the first time in American history.

Practical politicians hail President Truman as another master in the art of human relations as applied to politics, one who understands that fewer people are swayed by appeals to ideals than by their own self interests. In the election campaign, it will be recalled, Governor Dewey stuck to a lofty plane. He stressed the need for "national unity," "competence in government," the need for a "housecleaning" in Washington, etc. Even when he urged such proposals as expansion of the social security system to take better care of the needy and aged he did not get into specifics.

Materialistic Campaign—By contrast, President Truman put on a highly materialistic campaign—for which he really had established the basis in his address to the special session of Congress. He talked about equal rights for the Negro and about trying to hold the cost of living in check. He talked about decent homes for the poor, about spending more money for reclamation in the West, about farm price support, etc. He asked the voters to send a Congress to Washington that would work with him in achieving these objectives.

In the main, President Truman's cabinet is expected to stay as is, although three resignations are rumored in prospect. One, it is said without confirmation, involves Secretary Charles Sawyer, the best man who has headed the Commerce Department since Herbert Hoover.

Perhaps the most demoralization prevails among the 1500 or so people who constitute the staffs of the standing committees of Congress. Some of them, like Colin Stam of the Joint Committee on Internal Revenue Taxation, are expected to stay on, but most will be replaced. These staff people are a most interesting, dynamic and influential group whose friendship is widely sought while they are in the saddle. Comes a change in administration, however, and out they go.

Congress Convenes Jan. 3—Next big Washington event will be the convening of Congress on Jan. 3. The next Congress, because of the nature of President Truman's demands on the 80th Congress, and because of the clear mandate he has from the voters to get fulfillment of these demands by the 81st Congress, is expected to lose no time in getting down to cases on "must" legislation, particularly a housing program and price controls and a substitute for the Taft-Hartley Act. Aggressive Secretary of Labor Tobin already has a new labor bill in the draft stage.

The fact that inauguration will be a Democratic rather than the expected Republican show has caused further optimism among hotel managers. The minimum for a room fronting on Pennsylvania avenue now is $36 a day—and the minimum reservation is for three days, Jan. 18, 19 and 20—cash in advance. Avenue hotels also have a minimum of $24, same terms, on any outside room, and a minimum of $16 for strictly inside rooms. Some hotels a block away from the avenue have set rates of $16 to $19, cash in advance, and the minimum reservation period with some of them is four days. Many Washington hotels, however, will charge their regular rates—so that most business men having errands at that time should be able to come to Washington then without having to pay premiums.

Direct Mobilizing Planning

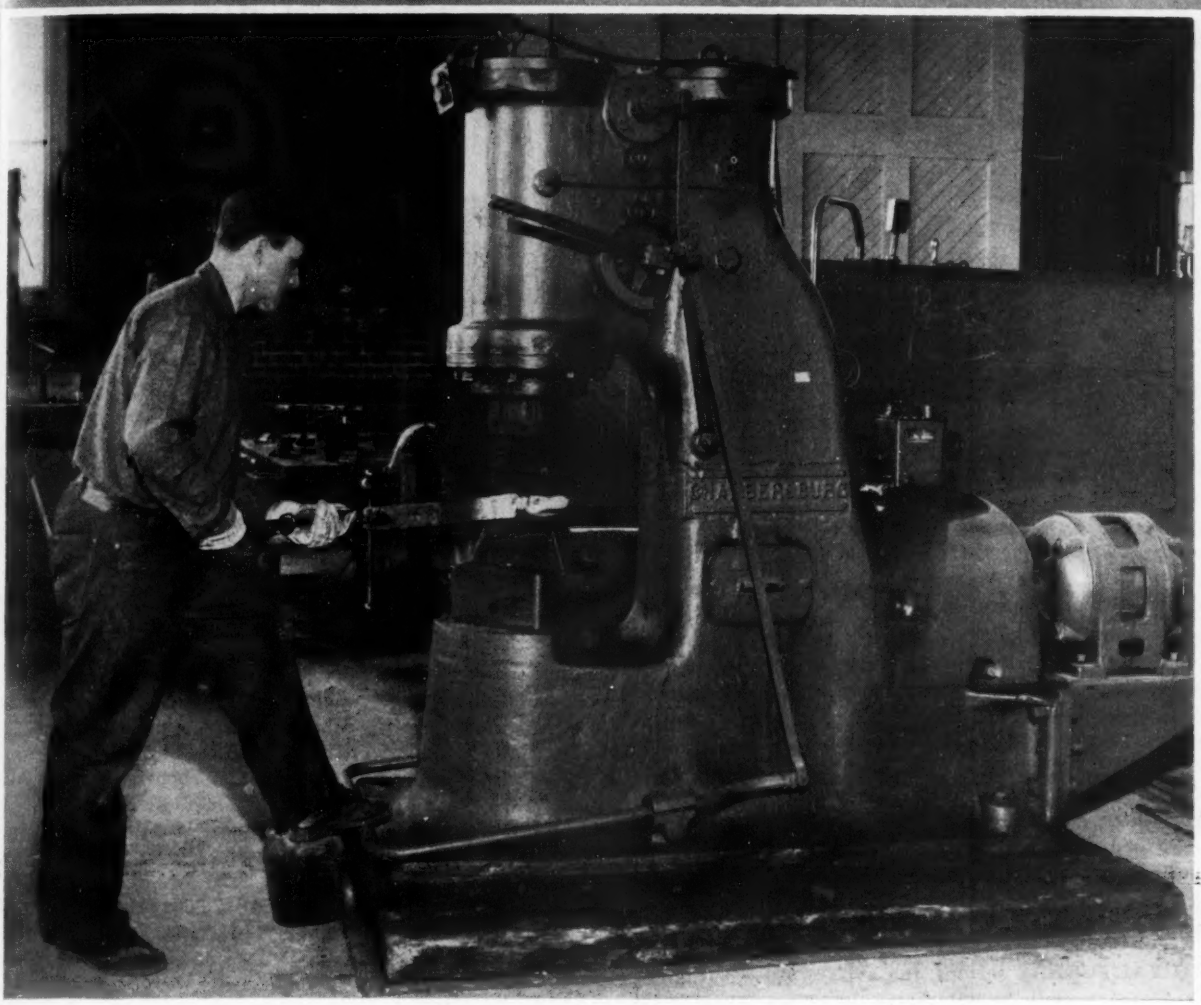
ORGANIZATION of the Ordnance Division of the National Security Resources Board has been completed with the appointment of Maj. Gen. Charles T. Harris Jr., retired, as director, and Col. Frank H. Higgins as deputy director. This is the division responsible for mobilizing planning in connection with the production of ordnance of all types. It is a unit of George E. Felton's Office of Production which, in another war, would take care of the duties discharged by the War Production Board in World War II.

General Harris has had more than 30 years' experience in the Army Ordnance Department. From 1933 to 1938 he took a leading part in industrial mobilization and procurement planning. From 1938 to 1942 he was assistant chief of ordnance in charge of all industrial matters. From 1942 until his retirement in 1946 he served as commandant at Aberdeen Proving Grounds.

Col. Higgins recently resigned as vice president of the Hupp Corp., automotive contract manufacturer, Detroit, to go with the NSRB. During World War II he served as chief of heavy artillery ammunition in the Ordnance Department. Prior to his connection with the Hupp Corp., he had spent 25 years with the Willys-Overland Co., rising to the post of plant manager before joining the armed services in the war.

NSRB Plans Small Task Groups

AS A MEANS of saving time in its industrial mobilization planning, the National Security Resources Board has adopted a policy of meeting with small task groups, each concerned with a specific product or a limited



A SELF-CONTAINED PNEUMATIC FORGING HAMMER

Self-contained motor compressor and hammer in one unit. Anti-friction bearings, clean, low-center-of-gravity construction, improved long ram guides are valuable features. Its greater forging output is due to heavier anvil construction, higher impact speeds and greater rapidity of blows.

Further details in Bulletin No. 16-L-7

CHAMBERSBURG ENGINEERING COMPANY, CHAMBERSBURG, PA.

CHAMBERSBURG

Builders of IMPACT *Machinery*

number of products. It already has met with task groups concerned with truck-trailers, manganese and chromium, and talc, and it plans to meet shortly with similar groups.

Membership of groups contacted to date, or about to be contacted, follows:

Truck-trailers: Julius Glick, Truck Engineering Corp., Cleveland; Harvey Fruehauf, Fruehauf Trailer Co., Detroit; Frank Schotters, Trailmobile Co., Cincinnati.

Manganese and chromium: Andrew Leith, E. J. Lavino & Co., Philadelphia; I. D. Sims, Bethlehem Steel Co., Bethlehem, Pa.; J. H. Spillane, Electro Metallurgical Co., New York.

Wire cloth: S. M. Jones, New York Wire Cloth Co., New York; W. F. Sewart, American Wire Fabrics Corp., New York; F. G. Gilbert, Chase Brass & Copper Inc., New York; John D. Stoddard, Cyclone Fence Co., Waukegan, Ill.

Copper: Jos. Mullaly, Anaconda Wire & Cable Co., New York; Guy Norton, Miles Metal Corp., New York; Charles Homer, North American Smelting Co., Philadelphia.

Aluminum and aluminum products: Hugo Wilder, Aluminum Co. of America, Pittsburgh; William A. Singer, Apex Smelting Co., Chicago.

Preview of Things To Come

MANUFACTURERS serving the aviation industry will be interested in the preview of coming developments given by John K. Northrop, president, Northrop Aircraft Inc., in a special lecture at the Library of Congress recently. Today's long-range bombers and fast interceptor planes will be largely supplanted within the next 10 years by winged missiles and guided rockets. The winged missiles, he said, will be propelled by "suitable power plants now in existence and capable of carrying large loads of TNT or any other destructive warhead."

The know-how for this missile, operating at speeds of approximately 600 miles an hour is presently available and is capable of extension to over 1000 miles an hour before 1960. Missile will have range sufficient for launching from the United States against any desired target in the northern hemisphere and will be navigated by automatic means.

For defense, he predicted rocket-powered interceptors, equipped for automatic guidance from the ground.

ECA Authorizations for 1949

ALTHOUGH the Economic Cooperation Administration has not finished

REPORTS PROGRESS: Paul Hoffman, administrator of the economic aid to Europe program, reports progress in recovery by many of the countries participating in the Marshall plan on his return from an inspection tour of Western Europe. NEA photo

screening the requests of the OEEC (Organization for European Economic Cooperation) for the first fiscal year of the Marshall Plan—1948-9—procurement authorizations now are being granted for goods to be shipped from the United States during the first half of calendar 1949. A sharp increase in the authorizations for machinery and other industrial equipment is reflected and this will be stepped up further.

By way of illustration, here are some typical items which have been purchased or are about to be purchased from United States manufacturers prior to July 1, 1949:

Railroad transportation equipment for Bizone Germany $5 million; engines and turbines for Czechoslovakia $300,000; wheel-type tractors for Denmark $315,000; track-laying tractors for Denmark $45,000; iron and steel mill materials, including ferroalloys, for France and French North Africa $8,725,000; construction and mining and other industrial equipment for Bizone Germany $6,280,000; iron and steel mill materials, including ferroalloys, for Denmark $1,855,000; "primary" iron and steel mill materials including billets, structural shapes, bars and plates, for France $1,315,000; construction, mining, electrical and other machinery, also aircraft parts and motor vehicle parts, for Iceland $645,000; machine tools for the Netherlands $2,080,000; textile, shoe and other special industry machinery for the Netherlands $1,225,000; office machinery for the Netherlands $200,000; iron and steel mill materials, including ferroalloys, for the United Kingdom $4,700,000.

Fourth Quarter Allocations—The above are picked from the lists of Nov. 1 and 2; similar items are reported every day. These authorizations are being made out of the fourth quarterly dollar allocation. Additional allocations will be made for the first and second quarters of next year.

A number of large authorizations to be made for special "projects" are to be acted on shortly. Included is $14 million of steel rolling mill equipment for France. The plan is to crowd through as many of these capital equipment authorizations as possible in the next few months, since re-equipment of Europe's industry is considered vital to promotion of recovery. Equipment for the steel and machine tool industries has been given first place in the order of priority, with these categories of equipment immediately following: Coal mining, oil refining, electrical, agricultural and textile.

The OEEC report cites as follows goals for steel ingot production in some of the countries as of July 1, 1949 compared with 1947 production: Austria 3,268,000 metric tons as against 3,017,000; Belgium and Luxemburg 7,150,000 as against 4,534,000; France 12,300,000 as against 6,452,000; Italy 2,200,000 as against 1,740,000; Netherlands 352,000 as against 190,000; Norway 55,000 as against 55,000; United Kingdom 14,987,000 as against 12,684,000; German Bizone 4,050,000 as against 2,950,000.

The above figures, however, should be taken as indicating the planned trend rather than accepted as accurate. As a matter of fact, German Bizone steel production already is at a rate in excess of 6 million tons of ingots annually.

Screening Difficult—At a recent press conference, ECA Administrator Paul Hoffman said screening of the OEEC requests was proving a difficult and time-consuming task. Rather than try to freeze a first-year program as at first contemplated, Mr. Hoffman stressed that flexibility is necessary to promote European recovery. It now is expected that the first-year program will be a fluid one.

This means, an ECA spokesman told STEEL, that the only safe procedure for United States manufacturers who want to get their share of this European business is to keep in contact with the key industries in the participating European nations so as to be on the spot as rehabilitation and expansion and general procurement programs are ready to jell.

World Revival Remains in Rehearsal

Norway has just submitted its recovery program. German role still uncertain. French performance continues ragged. Britain and Belgium know their parts

AS ONE of the co-directors and backers in the drama of world recovery, European Cooperation Administration finds that its gigantic performance is still in only the initial stage of rehearsal. Part of the play is just being written; some of the actors are not sure of their lines; general acting quality ranges from poor to brilliant.

Norway has just submitted its four-year recovery program. Although Germany is improving its production steadily, its lines for the final acts have not yet been decided upon. French performance continues ragged, particularly when compared with those of Great Britain and Belgium-Luxemburg.

Norway

NORWAY'S prospectus for a balanced economy by 1952-53 calls for reconstruction of her merchant and fishing fleets, rehabilitation of the mining industries, increased steel output and greater agricultural production through mechanization.

Norway's iron ore mining industry suffered heavily during the war, with the largest mines, together with a processing plant, at Syd Varanger badly damaged by the Germans. In 1938 Norwegian iron ore output was 1,475,000 tons; this year it will be about 300,000 tons. Output at these mines would be restored to 1,500,000 tons yearly by 1952-53. There are further possibilities of opening new ore deposits in the Dunderland range which can provide an additional 1 million tons yearly following a three to four-year development period.

The country's only domestic coal source is on the Arctic island of Spitzbergen. With full development these fields may yield an output of 800,000 tons yearly to provide for full domestic requirements and some export, besides. Power output is already far above prewar, but the present electricity production of 12.3 billion kwh would be increased to 16 billion kwh by 1952-53. This expansion would involve imports of turbines, generators, etc., totaling $44 million.

In the past Norway has imported most of its iron and steel—producing only 38,000 tons of pig iron and 35,000 tons of steel in 1938. Although 1948 output has risen to 30,000 and 60,000 tons respectively, total production represents only a fraction of the 400,000 tons of steel needed annually. Through developments in sponge iron production and increased output of vanadium and titanium pig iron, this combined production is expected to reach 105,000 tons yearly by 1952-53. Rolled and alloy steel production can be increased by 15,000 and 2000 tons respectively, giving a total steel output of 77,000 tons annually within four years.

Output of the works under construction at Mo i Rana will not be marketed before late 1953. This plant will then provide 160,000 tons of rolled steel yearly, and when completed, will have a capacity of 550,000 tons. Output of ferroalloys, which dropped from 136,000 tons in 1938 to 70,000 tons in 1948, is expected to rise in line with expanded power supplies to 120,000 tons in 1952-53. Most of this will be exported. Production of aluminum, copper, nickel and zinc will, generally, reach prewar levels by the end of 1948. Aluminum output will be expanded from 30,000 tons to 95,000 tons.

Of the planned gross industrial investment of $600 million, $320 million will represent machines and equipment, $160 million for plants and buildings and $120 million for repairs and maintenance.

Under the agricultural program, the nation estimates it needs $24 million in new farm machinery, of which about $9 million worth must come from the United States.

Western Germany

INDUSTRIAL production in Western Germany has risen to another new postwar record in September, but prospects for continued gains are clouded by coal and power shortages.

Industrial output in the British-American zones increased in September to 70 per cent of the 1936 level. This represents a gain of about 34 per cent since currency reform was executed in June, American Military Government reports. Postwar records were set in every industrial group except coal, but coal production was 82 per cent of 1936 levels. In June coal was at 80 per cent and industry as a whole at only 52 per cent.

AMG reports, however, that Bizonia's industrial gains are leveling off. Further improvement is contingent, says AMG, upon higher production and better utilization of scarce coal and electric power. Consumption of electricity has reached a new high, and power cut-offs are becoming increasingly common. Unemployment in the Western zones reached a new low of 754,600 the first week of October.

France

FRANCE's export-import ratio remains sadly out of balance. During the first eight months of this year, the nation imported twice as much as she exported. Bulk of the imbalance results from 70.7 billion francs' worth of goods imported from the U. S., as against 8.7 billion francs' worth exported to this country. France has a favorable trade balance with Great Britain, Belgium-Luxemburg, Netherlands, Switzerland, Portugal, Sweden, Norway, Greece, Austria, Ireland, Yugoslavia, Czechoslovakia, Turkey, Syria-Lebanon, Palestine, and Brazil.

All French basic industry is affected by the fact that current steel plate production is only 75 per cent of prewar. This situation will not be remedied until late in 1949 when two new continuous mills, ordered in the United States, will begin operation—a hot strip mill to produce 150 tons of plate an hour at the Denain works at Anzin and a cold rolling mill with an annual capacity of 250,000 tons to be setup at the Montataire works in Oise where it will reroll the blanks produced at Denain. The only continuous rolling mill, a cold one, now operating in France was set up by the Renault Co. in 1920 at Hagondange in Lorraine.

Great Britain

GREAT BRITAIN'S production performance continues impressive. The British Board of Trade has boosted export targets for 1949. For iron and steel manufactures, the value of exports will be increased from $32,400,000 estimated for 1948, to $34 million for 1949. The 1949 figures would be 16 per cent over iron and steel exports for 1948. This year the exports will be about 11 per cent over those for the prewar year.

Belgium-Luxemburg

ECA AID for Belgium for its iron and steel industry has been allotted as follows: Reconstruction and modernization of blast furnaces, $34 mil-

lion; steel plants, $23 million; rolling mills for strip, plates and sheets, $52 million; other rolling mills, $27 million.

Iron and steel exports from the union in September reached 332,695 tons, a postwar record. Exports to the United States totaled 11,575 tons, of which about half was pig iron. The union's export trade is particularly active with South American countries, Belgian Congo and Union of South Africa. Great Britain is negotiating for an additional 400,000 tons of steel products to be shipped in 1949.

While exports of basic iron and steel continue satisfactory, indirect exports of machinery and articles made of steel, in whole or in part, are now decreasing in the face of world competition.

St. Lawrence Seaway Power

CHANCES are good that construction of the international hydroelectric plant in the International Rapids section of the St. Lawrence River, near Massena, N. Y., will be authorized without an act of Congress.

Fine-tooth combing of the powers already granted revealed a way of doing this to some of Governor Dewey's lieutenants in New York state. The New York Power Authority took two simultaneous actions. It applied to the Federal Power Commission for a construction license, and it asked the State Department to recommend that the International Joint Commission give its blessing to execution of the project by the province of Ontario and the state of New York.

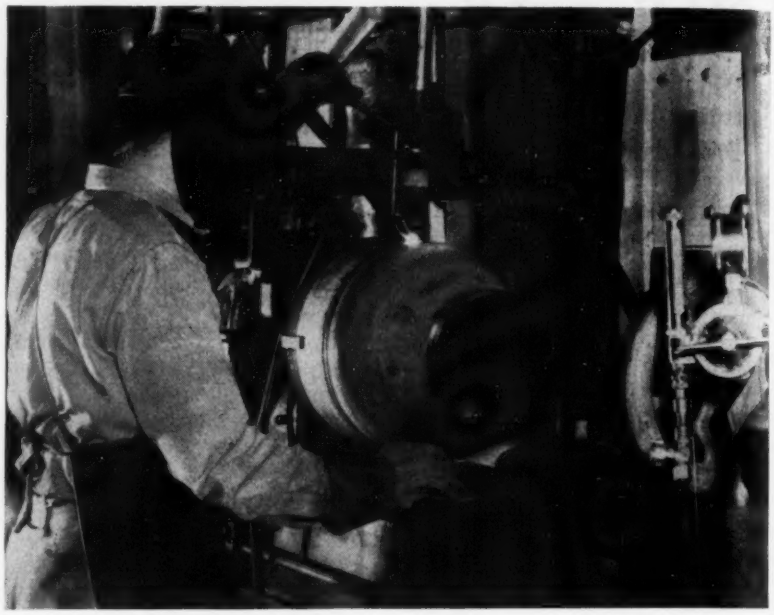
Can License—Prompt action came from the Federal Power Commission whose staff of attorneys reported last summer that a license could be issued by the commission under the Federal Water Power Act of 1920 which now is Part 1 of the Federal Power Act of 1935; the attorneys further recommended that the commission grant the license.

A series of hearings was held and Nov. 10 set as the final date for filing of briefs. Soon Examiner Glen Law will announce his decision which, on the basis of precedent, probably will be the commission's decision. Expectation is that the license will be authorized.

After the Federal Power Commission acts, the International Joint Commission is expected to give assent to the international phase of the project. The International Joint Commission was created by Canada and United States in 1909 to carry out the provisions of the Boundary Waters Treaty.

Ontario already has filed application with the International Joint Commission for approval of the project. Cost of the undertaking was estimated in July, 1948, at $452,827,000 of which the New York portion is $226,259,000.

Seaway Not Involved—The seaway part of the originally contemplated St. Lawrence river development, except for a dam and canal and some dredging in the Barnhart Island area, is not involved in the pending applications. Because of the appropriations necessary, action by the United States Congress and the Canadian Parliament will be required. Sen. Alexander Wiley (Rep., Wis.) plans to reintroduce in the 81st Congress his resolution calling for the seaway development. A spokesman for Senator Wiley told STEEL that at least some steel and iron ore interests, and even some coal interests, have swung over in favor of the project. The cause of this change of heart among the steel and iron ore people is the blocking out of at least 300 million tons of iron ore in Labrador.



WELDING STAINLESS: When Hinman Milking Machine Co. decided to fabricate stainless steel pails to be sold in conjunction with their machines, it selected a Heliwelding machine, using helium gas. The holder is in a fixed position with the work rotating beneath it

Colombia Eases Steel Import Rule

COLOMBIA has withdrawn its discrimination against merchant exporters, chiefly in the United States, of iron and steel products and has modified its rulings to permit mark-ups by such exporters of not more than 10 per cent over prices granted by manufacturing exporters.

Originally, in a regulation dated Sept. 7, 1948, Colombia had adopted measures restricting import licenses for iron and steel products to applicants purchasing directly from manufacturing exporters. Representatives of the National Association of Steel Exporters protested to the Office of International Trade, and the matter was taken up with Colombian officials.

A similar restriction in Chile, however, still remains in effect.

Fiat Buys American Tools

FIAT Automobile Co. of Turin, Italy, has contracted with Budd Co., Philadelphia for dies, jigs and other tools in order to speed up production of its new 4-cylinder, medium-sized car.

Armando Fiorelli, managing director of the Fiat works, who will remain in the United States until the contract is consummated, said it is hoped that a daily output of 300 Fiats will be reached by end of 1949.

Government Develops Dairy Aid

MANUFACTURERS looking for a new product might be interested in a new-type milk heater for use in many dairy manufacturing processes. Its chief merit is that it heats milk with less film or "milkstone coating" formation, thus reducing viscosity of such products as sweetened condensed milk. Invented by F. P. Hanrahan, of the Bureau of Dairy Industry, Department of Agriculture, Washington, it is covered by a public service patent and can be manufactured free of royalties.

Huge Power Market Seen

Annual electric machinery sales expected to reach $11 billion by 1957

RESULTS of a study by Market Development Department, Westinghouse Electric Corp., Pittsburgh, indicate that by 1957 electricity sales will amount to 374 billion kilowatt-hours and the total electric machinery market will be $11.2 billion annually as compared with $7.3 billion in 1947.

Generating capacity of 52 million kilowatts, at the end of 1947, will have to grow to 95 million in 1957 in order to support the projected load. The new capacity would provide a reserve of about 15 per cent which, although considerably below prewar margins, is estimated to be adequate in a larger, well integrated system with a more even distribution of load.

Westinghouse forecasters point out that the increase in electric machinery sales from 1947 to 1957 may at first appear optimistic but they add we have not yet realized the full impact of the replacement market. Sales of electric machinery in 1917, which became 30 years old in 1947, were $700 million. Some idea of the rate of growth that can be expected from replacement, which has not been a large factor up to the present time, is that machinery sold in 1927 totaled more than $1.6 billion.

Assuming average replacement on a 30-year basis, due either to equipment life or obsolescence, and maintenance to increase in proportion to the volume of electric equipment sales in the most recent 30-year period, the following breakdown is obtained of total electric machinery market in 1957: Additional equipment, $8.2 billion; replacement, $2.1 billion; maintenance $917 million.

Number of residential customers is expected to increase from 29.3 million in 1947 to 34 million in 1957. During this same period average kilowatt-hour consumption per residential customer is expected to grow from 1389 to 2400 with more electric home heating, television, higher lighting standards and air conditioning. Farm loads are expected to grow from the average total annual load of 2351 kilowatt-hours to 4000 kilowatt-hours by 1957.

Oil Supply Will Be Adequate

PETROLEUM industry will be able to fill all demands for refined petroleum products this year, according to predictions by William R. Boyd and F. van Covern, president and chief statistician, respectively, of American Petroleum Institute which met last week in Chicago for its annual convention.

As for the long-range supply outlook, Mr. Boyd said the industry was extremely optimistic about filling all needs of refined products. Actually at present the supply of all types of refined products is better than at any time since the war. Inventories of crude oil and all refined products in storage on Nov. 6 totaled about 582 million barrels, more than 50,000 barrels higher than a year earlier.

The convention also heard that the new Congress will probably not pass any laws that would seriously hamper the oil industry. It was pointed out, however, that the federal government has publicly stated it should control off-shore tidelands where a number of oil wells are now producing. Legislation on this matter can be expected.

AMA Studies Industry Headaches

AMERICAN Management Association reports that the results of an industry survey indicate that insufficient employee interest in increased production is one of the most pressing problems currently confronting production executives in their attempt to lower costs and increase output and quality.

Other problems are: Inability to meet customer deliveries because of uncertainty of deliveries from suppliers; maintenance inefficiency causing time lost for repairs; less than maximum effectiveness in physical handling of materials; inadequate leadership by foremen and supervisors; lack of sufficiently close co-ordination between production engineering and sales; inadequate inventory controls in scheduling full use of equipment; interruptions of production where design changes rapidly.

These topics will be discussed at an association meeting Nov. 18-19 in Chicago.

MAPI Confers on Capital Goods

MACHINERY & Allied Products Institute, Chicago, will hold its fourth conference on capital goods economics in Washington at the Mayflower, Dec. 10-11.

The conference will consider the following subjects: Position of capital equipment expenditures; basing point controversy and capital goods producers; the 1949 outlook for capital goods; work of Anglo-American Council on productivity; controls in a peacetime economy; over-all government procurement policy, including a discussion of cost standards, renegotiation, procurement procedures, etc.

Malleable Outlook Improves

ADDITIONAL ore from the Adirondacks, resumption of operations of the Mystic blast furnace in New England and availability of more iron from Tennessee and Texas will shortly ease the malleable melting stock shortage, declared James H. Lansing, research director, Malleable Founders Society, Cleveland, speaking at a recent meeting of the society's eastern section.

Lowell D. Ryan, managing director of the society, described preliminary research work of the society in market analysis and recommended that a thorough study of markets and trade promotion methods be adopted.

Calendar of Meetings . . .

Nov. 17-18, American Zinc Institute: Meeting of the Galvanizers Committee, Roosevelt Hotel, Pittsburgh.

Nov. 18-19, National Founders Association: Annual meeting, Sheraton Hotel, Chicago. Association executive vice president is L. E. Roark, 120 S. LaSalle St., Chicago.

Nov. 18-19, American Management Association: Production conference, Drake Hotel, Chicago. Association headquarters are at 330 W. 42nd St., New York.

Nov. 28-Dec. 3, American Society of Mechanical Engineers: 69th annual meeting, Hotel Pennsylvania, New York. Society headquarters are at 29 W. 39th St., New York.

Nov. 29-Dec. 4, 18th National Exposition of Power & Mechanical Engineering: Power Show, Grand Central Palace, New York.

Dec. 1-3, National Association of Manufacturers: Congress of American Industry, Waldorf-Astoria, New York.

Dec. 2-4, Society for Experimental Stress Analysis: Annual meeting, Hotel Commodore, New York. Society address is P.O. Box 168, Cambridge, Mass.

Dec. 2-4, Electric Furnace Steel Committee, Iron & Steel Division, AIME: Sixth annual conference, William Penn Hotel, Pittsburgh.

Dec. 2-4, American Metallizing Contractors Association: Annual meeting, Mayo Hotel, Tulsa, Okla. Association headquarters are at 773 Brownell Ave., St. Louis.

Dec. 3, Magnesium Association and Mellon Institute: Meeting on magnesium, Mellon Institute Auditorium, Pittsburgh.

Dec. 6-8, American Institute of Electrical Engineers: Conference on electric welding, Rackham Memorial Bldg., Detroit. Institute headquarters are at 33 W. 39th St., New York.

Dec.7-8, Diesel Engine Manufacturers Association: Meeting at Union League Club, Chicago. Association headquarters are at 1 N. LaSalle St., Chicago.

Dec. 10-11, Machinery & Allied Products Institute: Fourth conference in capital goods economics, at Hotel Mayflower, Washington. Washington office of the institute is at 910 17th St., NW.

Dec. 26-31, American Association for Advancement of Science: Annual meeting, Stevens and Sherman Hotels, Chicago.

Jan. 10-14, Materials Handling Institute and American Society of Mechanical Engineers: Materials handling show, New York.

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GREAT LAKES STEEL CORPORATION

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Motor car designs created by stylists and engineers, not by customers. Industry doubts that public really knows what it wants, but spends large sums on market research

DETROIT

WHO DICTATES the design of modern motor cars? It long has been a generally accepted belief around the industry, at least as far as its spokesmen were inclined to intone, that the public alone decided what it wanted and bought accordingly. Therefore, designers and stylists necessarily bowed to the public whim. On close analysis this is a lot of rubbish—high sounding but some distance from the truth. Body contours, seating arrangements, decorative treatments and the like are dreamed up by each individual company's artists and engineers, each group conscious of the other's limitations, and with a weather eye on the competition, after which their creations are submitted to top management and upon approval are released for production.

The car-buying public actually does not know what it wants, any more than the reader of a book or magazine knows what the author or editor should write. It simply says to the auto companies in effect: "Let's see what you've got. If we like it and we have the price or can borrow it, we'll buy." A reservation must be made, of course, in regard to today's market. Since the war the public attitude has been:—"Give us anything you can make and we'll pay more than it's worth." That profligacy is already in process of change.

Query Customers—Larger manufacturers maintain trained staffs engaged in the field of customer or consumer research, seeking to find out what the public wants and does not want. Especially in view of the kick in the teeth which samplers of public opinion absorbed two weeks ago, it appears there may be a lot of wasted effort being poured into this technique.

Only recently the Ford Motor Co. greatly enlarged its activities in this field, under the command of H. E. Everett Jr., formerly of Time Inc. The elder Mr. Ford used to be of the opinion he could handle "marketing research" himself, the timeworn remark, "Tell 'em they can have any color they want so long as it's black," attesting to his regard for this phase of the business. Now, however, a new day has dawned at Ford and the opinion samplers are hard at work. Their initial discoveries tend to confirm the belief that "people tend to say things they don't really believe, or say they want things they would not buy if they could actually see them."

Stylists Lead, Public Follows—The words are those of G. England of Ford's consumer and product research staff who examined the question in some detail at a recent meeting of American Society of Body Engineers here. Some of his further conclusions are worth remembering by anybody who is concerned with catering to the tastes of the retail market:

"Stylists and engineers are the key factors, and the public follows like sheep the dictates of the creative men.

"(In styling tastes) the public is following a coalition of industrialists and individuals, a combination of well-informed thought-leaders, engineers, stylists and product experts.

"Product leadership—may it not be simply the ability and good sense of stylists to judge the trends and temper of the times and of the public to go far enough but not too far?

"In thousands of reaction tests we have completed there appears to be little relation between what was most desired before the war and what seems most desirable now in such important car characteristics as instrument panels, car interiors and certain major engineering features. Why? All we know is that there is no rhyme or reason to buying motivation and the way people have changed in their ideas toward cars."

Don't Say What They Mean—Rationalization, or the tendency for most people to try to please interviewers, to make the interviewer think they are sound, modest and sensible people, is Mr. England's explanation for why people say they want less chrome or more headroom at the expense of low-rakish lines when experience shows they would not buy that kind of an automobile. This is a major danger in conventional approaches to product research. Another is the fact that the opinions of today's automobile owners may not be representative of tomorrow's markets or desires. Indications lead Mr. England to believe many of today's motorists have reached or passed their peak in their experience, where their youth, keenness of perception and their interest are no longer of great importance. Their interests may lie principally in the direction of functional performance and practicability, making their styling ideas of little value because they represent tastes acquired years ago. Product research experts perhaps must find a new sounding board of public opinion and reaction, new mirrors that will reflect more youthful points of view on the market of tomorrow.

If these views sound a little discouraging or hopeless, let it be remembered Mr. England is still firm in his belief industry too long has assumed the public can and should be conditioned to the product rather than the product be designed to fit the needs and yearnings of motorists —which brings us right back to where we started.

General Motors Corp. for many years has been a firm subscriber to the values of customer research, work

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1948	1947
January	422,236	366,205
February	399,471	393,663
March	519,154	443,588
April	462,323	445,137
May	359,996	404,191
June	454,401	421,466
July	489,736	399,456
August	478,146	364,478
September	437,181	444,501
October	506,539*	461,536
10 mos.	4,525,000*	4,144,221
November		417,493
December		492,109
12 mos.		5,055,284

* Preliminary.

Estimate for week ended:

	1948	1947
Oct. 23	123,067	106,159
Oct. 30	116,968	107,240
Nov. 6	117,225	106,651
Nov. 13	115,000	110,663

Estimates by Ward's Automotive Reports

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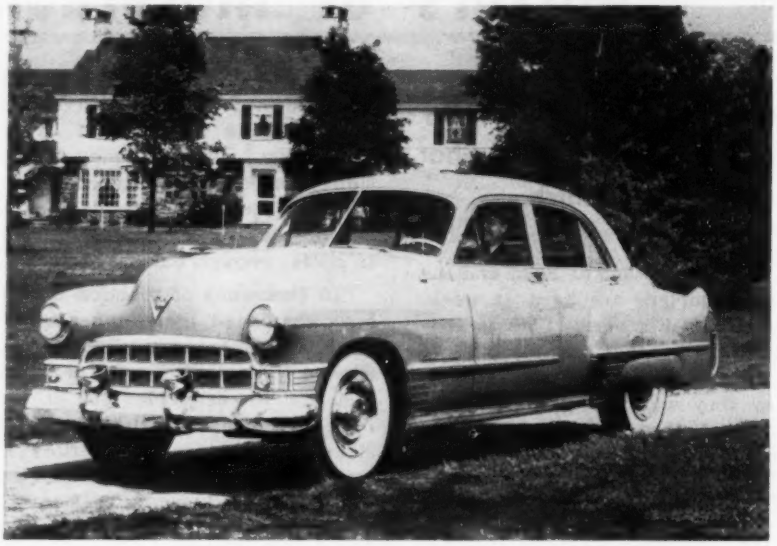

NEW CADILLAC: Grille treatment for the 1949 Cadillac 62 sedan is massive. All 1948 Cadillac models offer the new high-compression engine

which has been in the hands of H. G. Weaver. He has probably mailed a good many million copies of his chatty little booklets to car owners, sounding them out as to their "yes" or "no" on various phases of automobile design and construction. Whether he has ever come up with any clear-cut "mandates" may be open to question, at least it has been a lot of fun for the recipients of the questionnaires, and the compilation of replies must have been highly intriguing, although at times tiresome.

Warns Against "Elephantine" Cars—At the previously mentioned convention of body engineers, Virgil M. Exner, Studebaker engineer, predicted rough times ahead for the industry if it persisted in the present trend toward building what he termed "elephantine" cars. He said the policy would antagonize the public because such products are less economical, less distinctive and less dignified in the higher-priced lines. Retention of the elements of character and individuality he believed to be a "must" for the industry, in contrast to the present "fetish for fat contours."

Nash Begins Coast Assemblies

PRODUCTION has begun in Nash-Kelvinator's newly-completed automobile assembly plant at El Segundo, Calif.

According to Campbell Wood, plant manager, this will be the first production of Nash cars outside Wisconsin. Initially, the plant will assemble the "600" and "Ambassador" lines.

Schedules call for eventual output at the rate of 25,000 cars annually, on a single-shift basis. This will require 750 employees, with annual payroll of $2,500,000. The plant is on a 30-acre tract, and provides 500,000 square feet of floor space.

Chrysler Profit Up

CHRYSLER sales for the first nine months of the year were about $1070 million, yielding net profit of 4.91 per cent, or about $52.5 million. This compares with 4.74 per cent on sales for the same period in 1947, despite a decrease of 1660 units in production this year as against last. Output of an estimated 50,000 passenger cars was lost this year because of the Briggs Mfg. Co. strike.

Packard Shipments Higher

PACKARD'S nine-month showing despite the loss of 41 working days due to suppliers' labor difficulties, resulted in net income of nearly $9.5 million on sales of $164 million. Shipments were 65,354 units, against 39,233 in the same period last year.

K-F Nets $8.3 Million

THE Kaiser-Frazer take for nine months was a little better than $14 million before taxes, $8.3 million after taxes. Current production holds at better than 18,000 cars monthly, with additional new body types due for showing in the next few months.

GM Car, Truck Output Increased

GENERAL Motors produced 186,791 passenger cars and trucks in the United States and Canada during October, compared with the September total of 176,880. Of the total vehicles produced by GM in October, 143,232 were passenger cars and 43,559 were trucks.

GM's total car and truck production in the United States and Canada for the first 10 months of 1948 was 1,807,835, compared with 1,557,347 for the same period last year.

AMA Traces Auto Development

THIS week the Automobile Manufacturers Association is issuing copies of a handsomely printed and illustrated 40-page booklet, commemorating the industry's production of 100 million vehicles since its inception prior to the turn of the century. It relates the development of the motor vehicle, and traces the growth of many tributary enterprises which this outpouring of 89 per cent of all the world's motor vehicles has brought with it.

Production Not the Only Goal

MORE is expected of companies, large and small, than the development of good products at reasonable costs, Eugene Holman, president, Standard Oil Co. of New Jersey, told the Economic Club of Detroit. The American people feel that business men should be actively concerned about the whole society in which business operates, he stated, and business men, therefore, should continue to study such matters and express their views on every good occasion.

Describing his concepts of the responsibilities of "big business," Mr. Holman declared that some people think of bigness as a sort of unnatural and unhealthy growth. Bigness, however, is merely a technique for getting things done, and where it is suitable, bigness is a road to greater efficiency, better management, distribution of risk and more effective use of scientific methods. These factors result in greater social security, higher standards of living and greater national security, he explained.

To disprove the myth that there is a lack of competition in the United States, Mr. Holman cited figures to show that the number of manufacturing firms has increased 27 per cent over 1929 and 30,000 new firms have been established in an average year from 1900 to 1940. Noting some 4 million private enterprises in the nation, Mr. Holman stressed that 93 per cent have fewer than 100 employees. Also, he said, we now have 20 per cent more individual enterprises than before the war.

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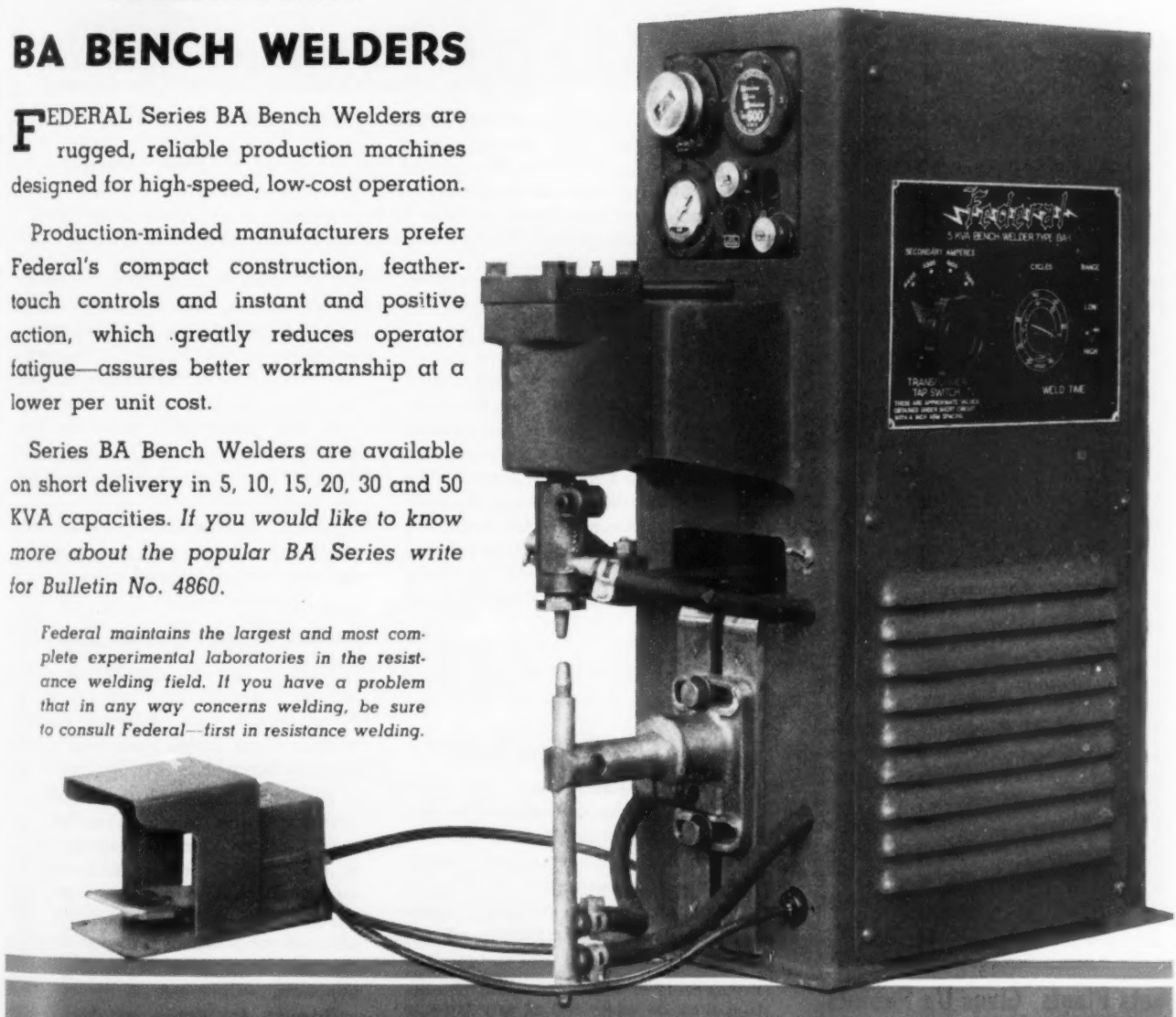
FEDERAL Series BA Bench Welders are rugged, reliable production machines designed for high-speed, low-cost operation.

Production-minded manufacturers prefer Federal's compact construction, feather-touch controls and instant and positive action, which greatly reduces operator fatigue—assures better workmanship at a lower per unit cost.

Series BA Bench Welders are available on short delivery in 5, 10, 15, 20, 30 and 50 KVA capacities. *If you would like to know more about the popular BA Series write for Bulletin No. 4860.*

Federal maintains the largest and most complete experimental laboratories in the resistance welding field. If you have a problem that in any way concerns welding, be sure to consult Federal—first in resistance welding.



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Big Business in Toys

Metal toy makers estimate current heavy volume should continue through 1949

METAL toy makers of the United States may not believe in Santa Claus, but they do estimate that their current heavy business volume should continue through 1949, provided the world is not derailed by another general war.

Metal toy volume will be about 45 per cent, as it has been in the past, of the total volume of the industry which for this year is being variously set at $150 to $200 million, based on manufacturers' prices. The industry produced $120 million worth of toys of all types in 1941 and $125 million worth in 1946. Dollar sales volume for some of the larger companies has increased four-fold since 1939.

High Prices May Cut Sales—Most difficult problem now facing the industry is high prices. In some quarters, it is felt that this situation may materially curtail volume. Supply of steel, however, is not a serious deterrent to production. The industry uses approximately 110,000 tons annually, slightly more than before the war, but its considerably increased volume output has been achieved through use of substitutes for steel, chiefly plastics parts. Nor is foreign competition, a major factor in prewar conditions, yet making itself felt. Toy imports, although showing an increase, will not exceed $2 million in value for the year, based on manufacturers' prices, and most of these items will not be of metal.

Industry's steel requirements include sheets, strip, wire, tin plate, cold drawn bars, fasteners and other products. Specifications for sheets usually include pickled, cold-rolled and annealed grades, ranging from 16 to 28 gage. Much end scrap, arising from shearing operations in automotive plants and stamping factories, normally finds its way into the manufacture of trains and track equipment, non-mechanical metal toys, mechanical devices, wheel goods and sleds. Considerable tonnage is also consumed in seamless tubing, and die and small sand castings.

Gets Plants, Gives Up Patents

ALUMINUM Co. of America is to buy the government-owned aluminum plant at Massena, N. Y., for $5 million and make available to the industry all of its alloy patents and its most important processes and fabricating patents without any reciprocal obligations.

The agreement covering this transaction also provides for sale to the Aluminum company of certain carbon producing equipment from the government's Burlington, N. J., plant for $175,000. In turn, War Assets Administration is to purchase from the Aluminum company for $115,000 a license under all of the company's machine patents applicable to all the World War II aluminum producing and fabricating facilities built by the Aluminum company for the government.

The agreement virtually ends the program to dispose of surplus aluminum plants.

SYKES HONORED: Wilfred Sykes, right, president of Inland Steel Co., receives the 1948 annual award of merit of the Chicago Technical Societies Council from Dr. Gustav Egloff, council president. Watching, left to right, are: Edward L. Ryerson, chairman, Inland Steel; Henry T. Heald, president, Illinois Institute of Technology; Dr. Leverett Lyon, chief executive officer, Chicago Association of Commerce and Industry

Republic Gets Furnace Lease

REPUBLIC Steel Corp. has been granted a 10-year lease of the government-owned blast furnace and accompanying coke ovens and related facilities at Gadsden, Ala. In addition, it has been given an option to renew the lease for five-year periods up to a maximum of 25 years and an option to buy the facility. The purchase option may be exercised at any time in the first 8 years of the lease.

The 10-year lease runs from Jan. 1, 1948. Republic will pay the government $1.55 for each net ton of basic or merchant pig iron produced in the furnace and 94 cents on each net ton of coke produced in the ovens.

The blast furnace along with coke ovens and related facilities was built and operated during the war for the government by Republic. The original cost to the government was $12,113,304. Republic operated the facilities until July, 1947, when the furnace was closed down for repairs. The furnace recently came back into production.

Annual capacity of the furnace is 280,000 tons, and annual capacity of the coke ovens, 328,000 tons.

Curtiss-Wright Denies Reports

DESPITE recent cancellation of an $80 million air force contract for F-87 all-weather jet fighters, Curtiss-Wright Corp. is not going out of the aircraft business.

The company last week issued a statement rebutting reports that the firm was abandoning making planes to concentrate on engines, propellers and non-aviation products. Curtiss-Wright states the cancellation has affected only about 10 per cent of the 3000 employees at its Columbus, O., plant.

Present Air Force and Navy contracts of the Airplane Division will keep the Columbus plant active until at least late next year. The company also says the cancellation of the jet contract was due to a change in Air Force technical requirements and that studies are continuing on the application of principles of the F-87 to other types of planes.

Briefs . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Hewitt Rubber Division, Hewitt-Robins Inc., Buffalo, has appointed Industrial Supply Co., Albuquerque, N. M., as a distributor in the New Mexico area.

—o—

Cleveland Co-operative Stove Co., Cleveland, has changed its name to Grand Industries Inc. Operation of the divisions of the company will be unchanged under the following trade names: Cleveland Foundry Co., Cleveland Distributing Co. and Grand Home Appliance Co. The vitreous enameling division will be operated as Grand Enameling Co.

—o—

H. K. Ferguson Co., Cleveland, industrial engineer and builder, is opening a Chicago office at 120 S. La Salle St. L. Douglas Lacy will be in charge of the office.

—o—

Aviation Maintenance Corp., Los Angeles, has resumed work following a six-month period on a standby basis. The company has contracts totaling approximately $300,000 from Aerovias Guest, a Mexican Airline; Air Ceylon and Pacific Northern Airlines.

—o—

Youngstown Sheet & Tube Co., Youngstown, will install coal washing equipment at its coal mines at De-Hue, Logan county, W. Va. It is estimated the whole project, including picking tables installed previously, will cost nearly $1 million.

—o—

Republic Steel Corp., Cleveland, has a steel warehouse nearing completion in Long Island City, N. Y. The warehouse will handle steel building products of Truscon Steel Co. and steel cabinets, lockers and shelving made by Berger Mfg. Co., both Republic subsidiaries.

—o—

General Electric Co., Schenectady, N. Y., is building an alternating current network analyzer for Indian Institute of Science, Bangalore, India.

—o—

Ivan Bloch & Associates, Portland, Oreg., has been formed as a firm of industrial consultants to operate in the Pacific Northwest and Alaska.

—o—

Rand Corp., Santa Monica, Calif., has been set up as a private, non-profit research organization and is at present working on problems of importance to the U. S. Air Force. Product of the organization's work will be made available to other government agencies.

—o—

Design & Development Engineers Inc., Chicago, has acquired Witte Co., Chicago, maker of package engineering and materials handling equipment.

—o—

Koppers Co. Inc., Pittsburgh, reports its Engineering & Construction Division has signed an agreement with Dr. Bronislaw Goldman, Pittsburgh consulting engineer, whereby the division will furnish the Goldman agitator for chemical or other industrial plant installations.

NEW FLOOR PLATE

ALAN Wood Steel Co., Conshohocken, Pa., now is in limited production of a radically new abrasive-impregnated floor plate. According to Leon Lieberman, research and sales department, No. 16 aluminum oxide grit—the same material used in grinding wheels—is rolled in the steel plate in one operation, forming a nonslipping floor plate that can be used on inclined surfaces of as much as 30 degrees. It also is said to maintain its abrasive qualities under all conditions in areas involving liquid films of oils, grease or water.

Revealed to industry for the first time at the National Metal Show recently, the development is estimated to have a life of about 20 to 30 years. At the Philadelphia show, the new plate excited the interest of many, including top executives of steel and abrasive companies.

—o—

Michigan Abrasive Co. has moved its fabricating facilities and general offices into new buildings at 2360 Jefferson Ave., Detroit.

—o—

Dowell Inc., subsidiary of Dow Chemical Co., Midland, Mich., has opened an industrial service point at 500 W. 22nd St., Anniston, Ala. W. C. Atkin will be in charge. Dowell treats oil and gas well installations and removes scale from large boilers.

—o—

United States Steel Supply Co., a U. S. Steel Corp. subsidiary, last week moved its general office and headquarters to 208 S. La Salle St., Chicago. Company's Chicago district sales office and warehouse remains at 1319 Wabansia Ave.

—o—

All-State Welding Alloys Inc., White Plains, N. Y., has made available through its distributors a new ac or dc stainless steel welding electrode developed to weld stainless steel types 301, 302, 304 and 308.

—o—

Reynolds Metals Co., Richmond, Va., has appointed American Brass & Copper Co., Oakland, Calif., as a distributor of aluminum wire, rod, bars, structurals, tubing and architectural shapes. Reynolds has also named Western Metals & Supply Co., San Diego, Calif., as a distributor of its aluminum mill products.

—o—

Parker Appliance Co., Cleveland, has named Hydraulic Power Equipment Co., Portland, Oreg., as a distributor in Oregon of tube fittings, valves and related equipment.

—o—

Eicor Inc., Chicago, manufacturer of electrical machinery, has discontinued production of some sizes of ac fractional horsepower motors and plans manufacture of a new consumer product at its Oglesby, Ill., plant.

—o—

Carboloy Co. Inc., Detroit, has expanded its industrial training school for carbide supervisors to provide for technical and other training on carbides for distributors' tool specialists and sales engineers.

—o—

Detrex Corp., Detroit, manufacturer of industrial chemicals, has moved its Los Angeles office and warehouse to 625 S. Anderson St.

—o—

Boeing Airplane Co., Seattle, has issued a call for 2000 additional employees. Total labor in Boeing's Seattle plants now exceeds 20,000.

—o—

Sterling Co., Cleveland, manufacturer of engineering and scientific instruments, has named Fostoria Industrial Service Co., Cleveland, as it sales representative for northeastern Ohio.

—o—

Hughes-Keenan Corp., manufacturer of cranes and other materials handling equipment, has moved its plant and offices from Mansfield, O., to Delaware, O.

—o—

R. Hoe & Co. Inc., New York, is building a factory branch in Birmingham for its Saw Division. Occupancy is expected by January.

The Business Trend

INDUSTRIAL activity continues at high levels although the last two weeks have shown some easing from the postwar high due primarily to lessened automobile output caused by model changeovers. For the week ended Nov. 6 STEEL's index was 177 per cent (preliminary) of the 1936-1939 average, two points below the postwar record.

October's weekly average of 176.8 per cent was well above that for any preceding postwar month, also 4.8 points higher than the best pre-October weekly mark.

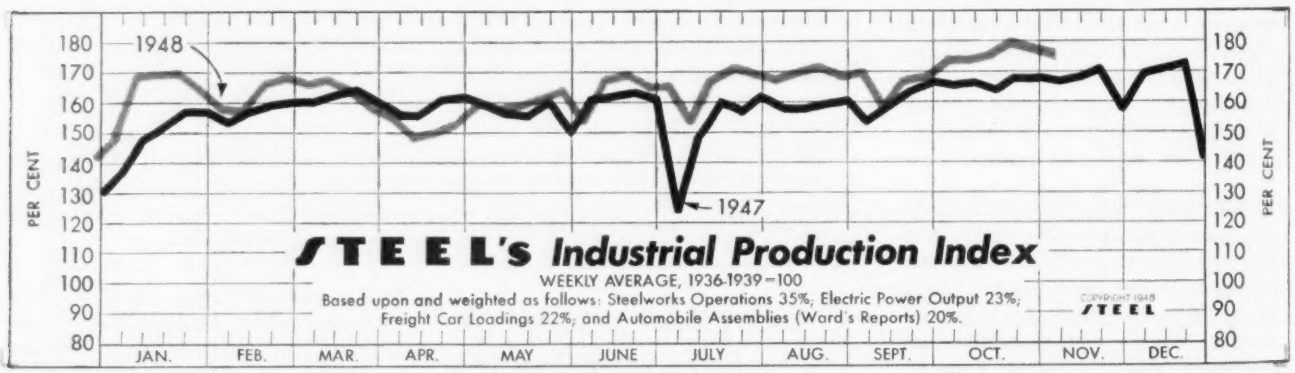
STEEL—Production of steel for ingots and castings in the week ended Nov. 6 was at 99 per cent of capacity for the second consecutive week to contribute materially to the high level of industry's output. Production for the week was nearly 200,000 tons greater than in the corresponding week of 1947 and more than 600,000 tons above the average weekly output of 1940, the highest prewar year.

PETROLEUM—Despite the continuing strike in some California refineries, daily crude production set a new high for the fourth consecutive seven-day period in the week ended Oct. 30. Daily output was boosted 8150 bbl to 5,604,100 bbl and crude runs to refineries increased 70,000 bbl to 5,626,000 bbl daily. Stocks of various petroleum products in millions of bbl were as follows on Nov. 1: Light fuel oil, 81.6; heavy fuel oil, 81.3; gasoline, 91.9; kerosene, 22.6.

COAL—Bituminous coal production for the week ended Oct. 30 at 12,240,000 net tons also registered a sizable gain of 170,000 tons over the preceding week but was more than 600,000 tons below the figure for the corresponding week last year. Bureau of Mines estimates place October production at 55,480,000 net tons, almost 5 million tons more than in September but 1.8 million tons below October, 1947. Stocks also rose 5.5 per cent during September to record a postwar high of 67.6 million tons on Oct. 1.

POWER—Another new high was registered in electric energy distributed during the week ended Oct. 30 with output nearing 5.6 billion kilowatt-hours, representing an increase of more than 16 million kilowatt-hours over the preceding week. Generating capacity will limit how high output will go, but it seems fairly certain that additional new marks are in prospect as lighting and heating requirement for industrial and home use increase during the winter months.

CARLOADINGS—Revenue freight loadings of 931,750 cars for week ended Oct. 30 represented an increase of 4218 cars over the preceding week but were 1 per cent below the corresponding week last year. The figure topped the previous high for the year established the preceding week and marked the first time this fall that the total was close to the aggregate of the corresponding week in 1947. In a year when a large number of production records have been chalked up by industry, carloadings have consistently lagged below last year's totals.



Index (chart above): Week ended Nov. 6 (preliminary) 177 Previous Week 178 Month Ago 175 Year Ago 167

BAROMETERS of BUSINESS

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	99.0	99.0	97.0	96.0
Electric Power Distributed (million kilowatt hours)	5,564	5,555	5,482	5,057
Bituminous Coal Production (daily av.—1000 tons)	2,040	2,012	1,941	2,156
Petroleum Production (daily av.—1000 bbl.)	5,627	5,604	5,535	5,240
Construction Volume (ENR—Unit $1,000,000)	$109.3	$179.1	$170.2	$97.3
Automobile and Truck Output (Ward's—number units)	117,225	116,968	119,398	106,651

* Dates on request. † 1948 weekly capacity is 1,802,476 net tons. 1947 weekly capacity was 1,749,928 net tons.

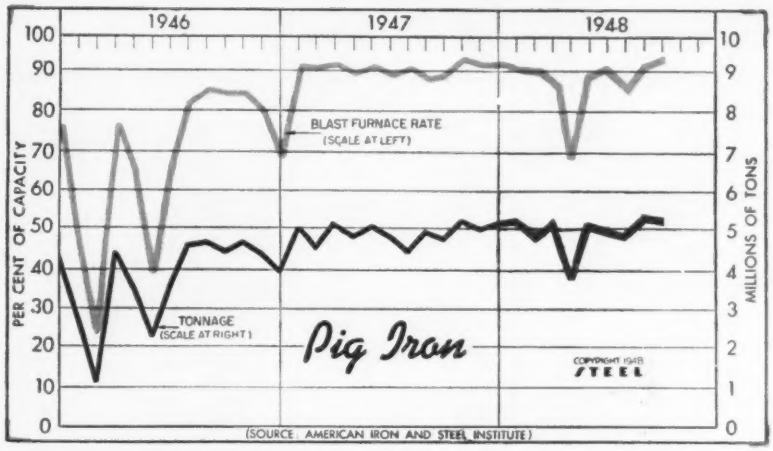
TRADE				
Freight Carloadings (unit—1000 cars)	908†	932	892	910
Business Failures (Dun & Bradstreet, number)	104	104	107	72
Money in Circulation (in millions of dollars)‡	$28,254	$28,091	$28,202	$28,635
Department Store Sales (changes from like wk. a yr. ago)‡	+2%	+12%	none	+13%

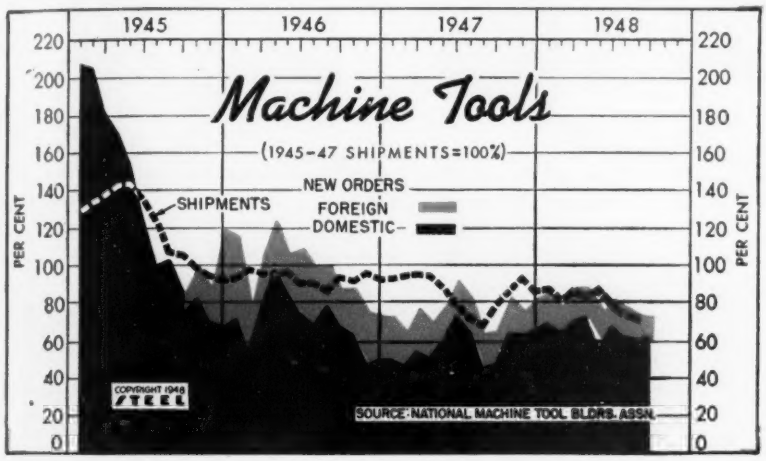
† Preliminary. ‡ Federal Reserve Board.

Pig Iron*

	Production (Net Tons—000)			Operating Rate (% of capacity)		
	1948	1947	1946	1948	1947	1946
Jan.	5,194	5,071	2,644	90.9	90.8	47.4
Feb.	4,838	4,550	1,148	90.6	90.3	22.2
Mar.	5,020	5,123	4,424	87.8	91.8	77.3
Apr.	3,840	4,830	3,614	69.4	89.3	65.2
May	5,077	5,081	2,274	88.8	91.0	39.8
June	4,990	4,810	3,682	90.2	89.0	66.5
July	4,900	4,585	4,705	85.9	90.3	82.4
Aug.	5,255	4,916	4,898	92.0	88.1	85.6
Sept.	5,208	4,801	4,687	94.3	89.0	84.8
Oct.	....	5,228	4,814	...	93.6	84.1
Nov.	....	5,015	4,435	...	92.8	80.0
Dec.	....	5,177	3,992	...	92.9	69.9
Total	....	59,210	45,318	Ave...	90.1	67.4

* Includes ferromanganese and spiegeleisen.





Machine Tools

(1945-47 Shipments=100)

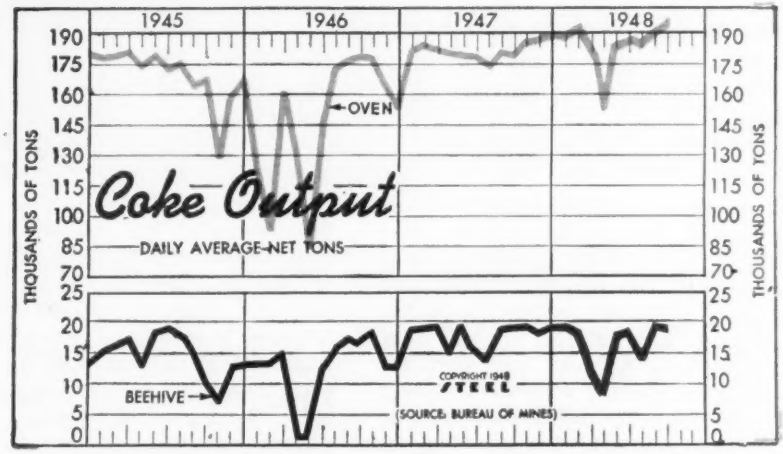
	Orders—Total		Orders—Domestic		Shipments (3 Mos. Ave. Centered)	
	1948	1947	1948	1947	1948	1947
Jan.	83.1	71.7	69.1	50.7	86.9	93.1
Feb.	77.3	63.8	64.6	48.0	81.9	94.8
Mar.	86.3	74.3	70.2	54.2	84.2	95.4
Apr.	86.3	69.8	72.2	51.0	82.7	94.3
May	73.5	76.9	62.1	60.6	86.3	88.9
June	83.4	90.9	71.5	73.7	79.9	79.5
July	74.0	81.1	61.1	64.4	75.3	71.0
Aug.	73.7	62.1	60.9	47.5	72.3	68.6
Sept.	73.1	63.7	61.5	49.0	...	78.5
Oct.	...	81.0	...	65.0	...	85.5
Nov.	...	75.6	...	64.1	...	92.6
Dec.	...	81.1	...	66.3	...	86.1

Coke Output

Bureau of Mines

(Daily Average Net Tons)

	Oven		Beehive	
	1948	1947	1948	1947
Jan.	189,191	181,245	19,554	18,124
Feb.	190,098	183,189	18,596	18,372
Mar.	182,340	182,529	10,458	18,725
Apr.	149,692	179,428	8,205	14,591
May	184,568	179,400	18,623	19,800
June	186,425	178,400	18,002	15,700
July	184,286	174,300	14,036	14,100
Aug.	188,468	181,697	19,749	18,346
Sept.	192,090	179,872	19,594	19,800
Oct.	.....	187,009	.....	19,786
Nov.	.....	188,342	.....	18,316
Dec.	.....	189,886	.....	19,454
Ave.	.....	182,108	.....	17,926



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$13,064	$14,343	$14,150	$12,950
Federal Gross Debt (billions)	$252.5	$252.3	$252.3	$258.8
Bond Volume, NYSE (millions)	$21.3	$21.3	$15.2	$16.3
Stocks Sales, NYSE (thousands)	9,392	5,395	3,484	3,664
Loans and Investments (billions)†	$62.4	$62.3	$61.9	$65.0
United States Gov't. Obligations Held (millions)†	$33,496	$33,416	$32,559	$38,192

† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$95.05	$95.05	$95.05	$76.09
All Commodities†	163.8	165.3	167.1	157.4
Industrial Raw Materials†	176.2	178.2	179.7	175.9
Manufactured Products†	159.4	160.9	163.1	150.0

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry

PAUL E. BUTZIN

M. A. KING

RUSSELL INWOOD

Paul E. Butzin has been appointed director of engineering, Delta Mfg. Division of Rockwell Mfg. Co., at Milwaukee. He had been associated with this division from 1933 until 1942, and was the first permanent design engineer employed by the company. In 1942 he was appointed chief engineer, Milwaukee Gear Co., where he later was named works manager. Since completing school in 1916 Mr. Butzin has been active as a product and machine designer in the machine tool, electrical and steel fabricating industries. He served as supervisor of tool design for A. O. Smith Corp., Milwaukee, from 1927 to 1933.

—o—

G. B. Davis has been promoted from assistant sales manager to sales manager of Baker-Raulang Co., Cleveland. This does not involve any change of duties as Mr. Davis has been in active charge of the sales negotiations for some time past. He became associated with the company in 1935 and joined the sales staff of the Baker Industrial Truck Division two years later.

—o—

Monarch Machine Tool Co., Sidney, O., announces establishment of a Cincinnati sales office in the Roselawn Center Bldg., and transfer from Indianapolis to Cincinnati of **Frank Heap** to head an expanded Cincinnati-Indianapolis sales territory for the company. **Don Potter,** formerly assistant to Mr. Heap, assumes charge of the Indianapolis office, which is retained in the new territorial set-up.

—o—

Richard C. Lawton has been appointed district engineer in the territory of western New York state, with headquarters in Rochester. He represents the Bearings Division, Torrington Co., Torrington, Conn., and South Bend, Ind. **J. H. Williams** is now assisting **L. A. Toth** in the Dallas office of Torrington Co. as district engineer. Mr. Toth has been named district manager of the Dallas office after three years in the Southwest. **J. N. Wholean** has joined the Milwaukee staff, representing the Bearings Division as district engineer. **D. E. Lewis** is district manager of the Milwaukee office, and has been in that area for three years.

—o—

M. A. King, formerly manager of engineering, has rejoined the Elliott Co., Jeannette, Pa., as engineering vice president, Jeannette Division. For the past five years he has been executive engineer for the Turbine Division, Worthington Pump & Machinery Corp. He had previously been with Elliott Co. for 27 years and in 1941 was appointed manager of engineering for the company.

—o—

Brainard Steel Co., Warren, O., subsidiary, Sharon Steel Corp., announces the following appointments: **Frank E. Houck,** formerly Cleveland district sales manager, has been appointed manager of sales, Steel Strapping Division; **Charles E. Nail,** associated with sales for the past three years, has been appointed manager of sales, Electric Welded Tubing Division; and **Gordon E. Tomb** of the Building Productions Division has been appointed manager of sales, Tel-O-Post Division.

—o—

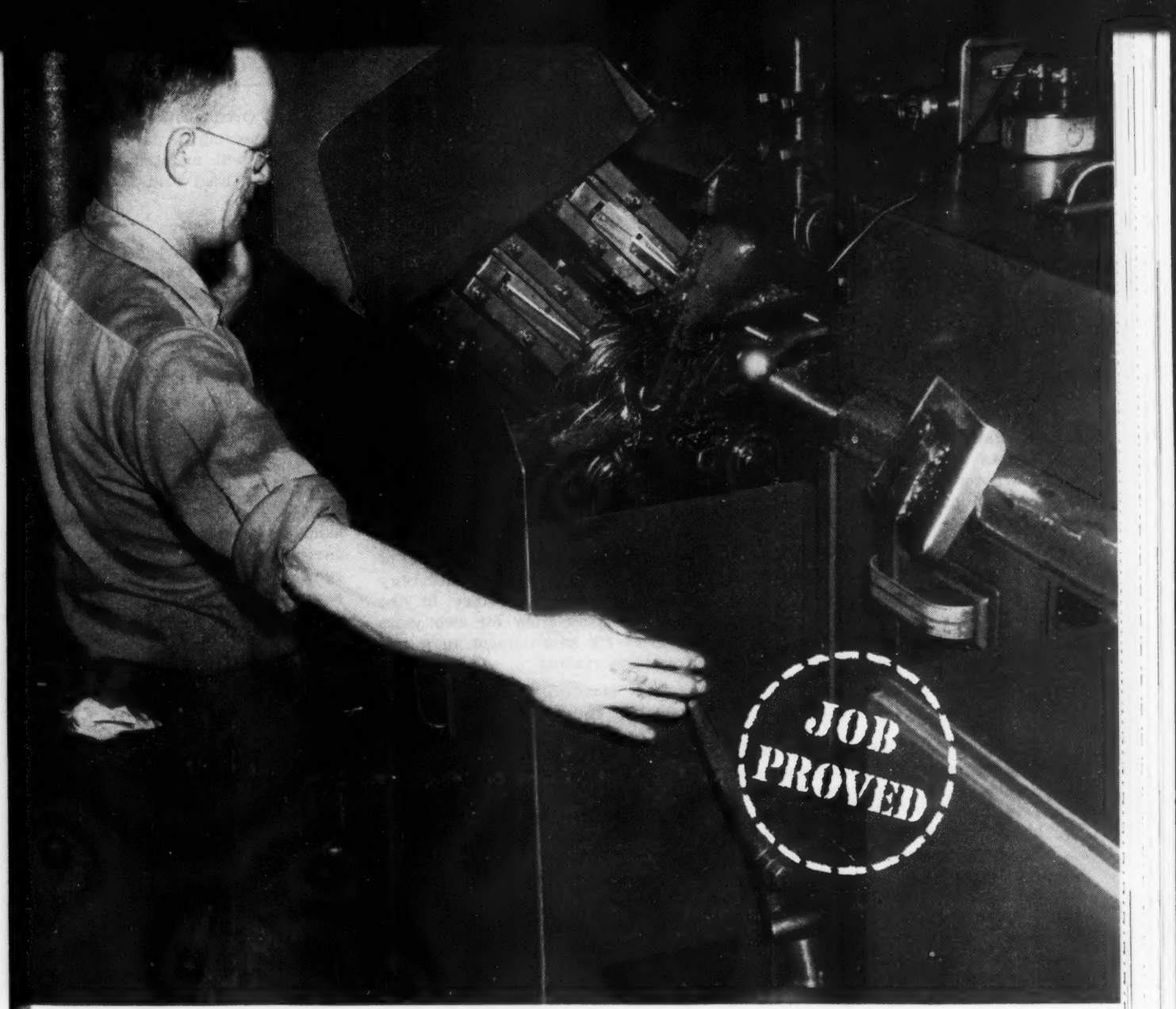
E. E. Bradberry has been appointed assistant manager of sales in Chicago by Jessop Steel Co., Washington, Pa. His offices are at 332 South Michigan Ave., Chicago. He was formerly stainless sales engineer in the Chicago office of Carnegie-Illinois Steel Corp.

—o—

Russell Inwood has been appointed vice president in charge of manufacturing and engineering, Rapids-Standard Co. Inc., Grand Rapids, Mich. He has been with the company for eight years, and for the past five was superintendent of the Bond Ave., Grand Rapids, plant. In his new capacity he will be responsible for production engineering, product development and research engineering, as well as for all manufacturing activities, tool and die facilities, and personnel activities in the Manufacturing and Engineering Divisions of the company.

—o—

Clarence C. Walker, formerly commercial vice president assigned to customer relations work in the New England area for General Electric Co., has been appointed general manager of the company's construction materials department, Bridgeport, Conn. He succeeds the late **Carroll D. Hepler.** Other appointments announced for the construction materials department are: **F. Penn Holter,** formerly connected with Lockheed Aircraft Corp., named assistant manager of manufacturing for the department; **Charles R. Shields,** an auditor for the company in Chicago, appointed manager of marketing service; **Charles K. Skinner** has been named materials co-ordinator. He has been with the purchasing section, appliance and merchandise depart-



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One New Sunicut Grade with Petrofac* Replaces Two Oils, Gives Improved Performance and Lowers Costs

Part: Knurled rise nuts for Stillson wrenches
Operation: Spot, drill, knurl, and cut off
Machines: New Britain Model 61's
Materials: SAE X1112 and X1113 Bar Stock
Tools: Rex AA High-Speed Tool Steel
Cutting Speed: 156 S.F.P.M.
Cycle Time: 9.9 seconds
Production: 363 pieces per hour per machine

A manufacturer of wrenches was using two oils in his automatic screw machines—a dark cutting oil and a lubricating oil. Replacing both with one grade of new Sunicut with Petrofac, he found the way to many benefits. Savings have been substantial. Dilution of cutting oil through seepage is no longer possible. Drain-off from chips is increased. There is only one oil to buy, store and handle. Finish is better, tool life longer, work visibility improved.

Because the new Sunicut grades with Petrofac possess superior metal-wetting, antiweld and extreme-pressure qualities, they are giving outstanding performance throughout the metal working industry. They are not blended with animal or vegetable fatty oils—cannot turn rancid. For more information write for folder S-11.

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ment; and **Frederick V. Courtade,** appointed manufacturing engineer for the company's Conduit Products Division. He formerly was a member of the appliance and merchandise department's planning division.

—o—

George F. Bateson Jr. has been appointed assistant manager, Warehouse Division, Republic Steel Corp., Cleveland. In his new capacity he will assist in the management of the 24 fabricated product warehouses which Republic and Truscon Steel Co., a subsidiary, operate throughout the United States. He has been serving as branch sales manager in Charleston, W. Va., for the Truscon organization.

—o—

W. D. Jewett, export manager, Dominion Bridge Co. Ltd., Montreal, Canada, has been elected president of the Canadian Exporters' Association. He has been a director of the association for some time and was elected to the post of vice president in 1946.

—o—

J. T. Gillespie Jr. has been appointed sales manager, Watson-Stillman Co., Roselle, N. J., which he joined in 1944 as director of export sales. In his new position he will continue to supervise the company's export sales. For 10 years prior to joining Watson-Stillman Co. Mr. Gillespie held sales and administrative positions with Air Reduction Co. Inc., New York, and its subsidiary, Wilson Welder & Metals Co., where he was assistant to the president. For three years of World War II he was on loan from Air Reduction Co. to the government.

—o—

Dr. Robert B. Freeman has been appointed chief metallurgist, Columbia Steel Co., succeeding **Gordon L. von Planck,** who has been made metallurgical consultant. **Thomas E. Caldwell** succeeds Dr. Freeman as works metallurgist at the company's Pittsburg, Calif., plant, and will be assisted by **H. Edward Doleman. Lewis W. Roe** has been promoted to the position of assistant comptroller in charge of costs and statistics for Columbia. He formerly was statistical supervisor.

—o—

Belmont Packing & Rubber Co., Philadelphia, has elected **O. W. Wagner** president and treasurer to succeed the late **George C. Gillies.**

—o—

Frank J. Armstrong, traffic manager, United States Radiator Corp., Detroit, has been elected a vice president of the National Association of Shippers Advisory Boards. He served for several years as president of the Great Lakes Regional Advisory Board, and was secretary of the National Association for two years prior to his advancement to a vice presidency.

—o—

Daniel F. Hulgrave has been named director of purchasing and salvage section of the procurement and schedules staff of General Motors Corp., Detroit. He has been manager of purchases, Cadillac Motor Car Division, and succeeds **H. L. Dingler,** who, for reasons of health, is being assigned other duties. **Raymond A. Vogel,** a veteran of 34 years in Cadillac's purchasing department, has been named to succeed Mr. Hulgrave as manager of purchases for the division.

—o—

V. C. Leatherby has been named Pittsburgh engineer for Industrial Ovens Inc., Cleveland. He will act as the company's representative in western Pennsylvania. Mr. Leatherby has been a sales engineering representative in Pittsburgh and Cleveland for companies in lines allied to Industrial Ovens' activities in the industrial heating and processing fields. He will maintain offices at 908 Peoples East End Bldg., Pittsburgh.

—o—

Donald Q. Kern has joined the Process Engineering Division, Patterson Foundry & Machine Co., New York, and has been appointed director of engineering of that division. He resigned last year from the Foster Wheeler Corp. after a long term of employment, and has since completed a book on process heat transfer to be published next summer.

—o—

Osgood Co., Marion, O., manufacturer of power shovels and material handling equipment, has appointed **James M. Herring** as service manager. He has been with the company since 1928, and in 1937 became an operator-erector, which position he resumed in 1945 with the company following his discharge from service during the war.

—o—

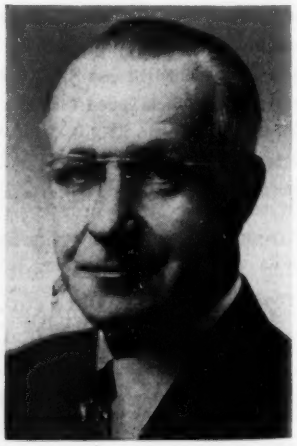
Charles P. Hammond has been appointed superintendent of mills, Rotary Electric Steel Co., Detroit. He formerly was superintendent of mills for 15 years with Atlas Steels Ltd., Welland, Ont., and prior to that time was connected with United Alloy, Canton, O., and Crucible Steel Co. of America.

—o—

C. D. Clawson, president, Ferro Enamel Corp., Cleveland, has been elected to a second term as president, Porcelain Enamel Institute. Newly elected to the office of vice president of the institute were **T. G. Harris,** Porcelain Steel Corp., Connersville, Ind., and **R. A. Dadisman,** Armco Steel Corp., Middletown, O. **E. P. Calkins,** General Porcelain Enameling & Mfg. Co., Chicago, and **Burton Longwell,** Republic Steel Corp.,

J. T. GILLESPIE JR.

V. C. LEATHERBY



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- Speeds Production

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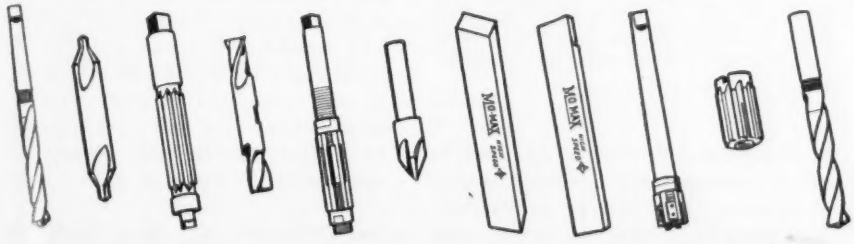
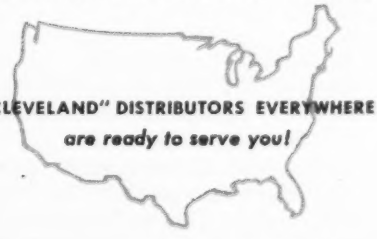
ASK YOUR INDUSTRIAL SUPPLY DISTRIBUTOR FOR THESE AND OTHER CLEVELAND TOOLS





"CLEVELAND" DISTRIBUTORS EVERYWHERE
are ready to serve you!

Cleveland, were elected to the board of trustees.

—o—

Frank F. Bonnevier has been appointed plant superintendent, Buffalo Stainless Casting Corp., Buffalo, which started production of stainless steel castings in mid-September. Mr. Bonnevier formerly was with the Frederick B. Stevens Co. in Detroit for about two years. Prior to that he was with the Cooper Alloy Foundry Co., Hillside, N. J., and Allegheny Ludlum Steel Corp. in Buffalo.

—o—

Cleco Division, Reed Roller Bit Co., announces the appointment of **Edward C. Nissen** as special representative in San Francisco. He will act as liaison between the general sales office in Houston, Tex., and local dealer organizations.

—o—

Foundry Equipment Manufacturers Association has elected the following officers to serve during 1949: President, **William L. Dean,** president and general manager, Mathews Conveyor Co., Ellwood City, Pa.; vice president, **John Hellstrom,** vice president, American Air Filter Co., Louisville; and executive secretary and treasurer, **Arthur J. Tuscany,** Arthur J. Tuscany Organization, Cleveland. Mr. Dean succeeds as president of the association **Otto Pfaff,** president, American Wheelabrator & Equipment Corp., Mishawaka, Ind.

—o—

Ray H. Anders has been appointed director of purchases, Sun Oil Co., Philadelphia, to succeed **Henry Thomas,** who retires Dec. 1 after 36 years of service. Mr. Anders, until recently manager of the company's industrial products department, will be assisted in his new duties by **Roy A. Hurst,** assistant director of purchases.

—o—

Louis S. Kimball, recently with Bell Aircraft Corp. as sales manager, Prime Mover Division, has been made general manager of Angier Corp., Framingham, Mass.

—o—

John F. Hall has been appointed district engineer in charge of the New York office, Portland Cement Association, Chicago, succeeding **E. M. Fleming,** retired.

—o—

The executive committee of the British Iron & Steel Federation, London, Eng., announces the resignation of its commercial and technical director, **Sir John Duncanson.** He joined Iron & Steel Control at the beginning of the war in 1939 and succeeded to the controllership in 1942. He held

DR. HARRY P. CROFT

this position until 1945, when he assumed his appointment with the Federation. He is succeeded at the Federation by **Edward W. Senior,** who also served throughout the war in the Iron & Steel Control.

—o—

Titus N. Radu has been appointed foreign sales manager, Arco Co., Cleveland and Los Angeles. He joined Arco this year, and formerly was with United Laboratories Export Corp.

—o—

Wheeling Bronze Casting Co., Wheeling, W. Va., announces the appointment of **Dr. Harry P. Croft** as vice president in charge of development. He formerly was associated with Chase Brass & Copper Co. Inc. as director of technical control and research of the Midwestern Division. In the early part of World War II Dr. Croft served as copper consultant, Bureau of Conservation, Office of Production Management, Washington, and later as chief of the Industrial Division, Cleveland Ordnance District.

—o—

M. A. Toussaint, Conlon Division assistant to the president, Conlon-Moore Corp., Chicago, has been appointed chairman of the Ironer Division, American Washer & Ironer Manufacturers' Association. He also is chairman of the association's sales and advertising committee.

—o—

Seaboard Chapter, Institute of Scrap Iron & Steel Inc., has elected **Sherrod Nott,** Frank H. Nott Co. Inc., vice president, and **Irving Lazinsky,** Continental Iron & Metal Co. of Baltimore, secretary-treasurer.

—o—

Hercules Steel Products Corp., Galion, O., announces the following changes in organization: **George C. McClure** has been appointed executive vice president in charge of operations; **Fred Biszantz,** vice president and advisory engineer in charge of research and development; and **Alfred Dangler Jr.,** vice president in charge of operations at Star Mfg. Co., St. Louis, a subsidiary.

—o—

Donald J. Lynn, senior partner in the law firm of Harrington, Huxley & Smith, Youngstown, has been elected to the board of directors, General Fireproofing Co., Youngstown, with which he has been closely associated for many years in a legal capacity. He succeeds the late **Renick M. Bell.**

—o—

Harold K. Hochschild, president, American Metal Co. Ltd., has accepted chairmanship of the Non-Ferrous Metals Division of the current United Hospital Fund Campaign in Greater New York. **Charles Macall,** general sales manager, Bethlehem Steel Corp., has accepted the chairmanship of the Steel & Iron Division.

—o—

Electric Furnace Co., Salem, O., announces appointment of **R. R. Griner,** 3012 McGee Trafficway, Kansas City, Mo., as its western sales agent. Until recently he has been furnace engineer for the Wright Aeronautical Corp. of Paterson, N. J., and was formerly an erection and service engineer with Electric Furnace Co.

—o—

Carroll Edgar has been appointed a representative in the Seattle area for Kennametal Inc., Latrobe, Pa. **William L. Chambers,** application engineer for the company, has been transferred from the midwestern district to the Pittsburgh district office. **John D. Cook** has been appointed an application engineer in the midwestern district, and will work out of the company office at Chicago.

—o—

William J. McGraw, manager of electric tool sales in the New York territory, has been appointed manager of the Cleveland branch of Independent Pneumatic Tool Co., Aurora, Ill. He will be succeeded by **Ed B. Rosell,** electric tool service engineer in the Chicago branch territory.

—o—

H. C. Erskine, Cleveland works manager, Aluminum Co. of America, has been named to head a committee being formed by the Associated Industries of Cleveland to work with the utilities companies and public agencies to protect the interests of domestic and industrial users of gas.

—o—

Mack Trucks Inc., New York, an-

nounces the promotion of **T. J. Zeller** to factory manager of its Allentown, Pa., plant, succeeding **C. J. Moran,** and the advancement of **A. C. Schliewen** to manager of its Plainfield, N. J., plant, succeeding Mr. Zeller. Mr. Moran has been transferred to Mack's western sales headquarters in Los Angeles.

—o—

M. G. McGregor has been appointed sales manager, Ahlberg Bearing Co., Chicago. The appointment embraces direction of all sales activities in the company's 14 branch offices. Formerly manager of replacement bearing sales for the company, Mr. McGregor has been with the company 22 years.

—o—

J. H. Dingee has been appointed advertising manager, Henry Disston & Sons Inc., Philadelphia, succeeding the late **J. William Jay.**

—o—

Herbert E. Johnson has been appointed superintendent of transportation and labor for the Youngstown district, Youngstown Sheet & Tube Co. He joined the company in 1944 as superintendent of transportation and labor at its Brier Hill works.

—o—

Malcolm C. Reed has been elected vice president in charge of sales, Dunkirk Radiator Corp., Dunkirk, N. Y. He succeeds **Carl A. Sawade,** now head of the company's general sales offices in New York. Succeeding Mr. Reed as secretary is his brother, **Robert E. Reed,** formerly assistant superintendent, and as purchasing agent, **Joseph N. Vandervoort. Seth C. Johnson,** formerly of

EDWARD M. DOUGLAS

the clerical department, was named assistant treasurer.

—o—

Office Equipment Manufacturers Institute has elected as its president **Edward M. Douglas,** vice president of International Business Machines Corp. He previously held the position of vice president and chairman of the general executive committee of the institute. Other officers elected are: Vice president and chairman of the general executive committee, **R. S. Oelman,** vice president, National Cash Register Co.; vice president and chairman of the sales executive committee, **Harry C. Anderson,** vice president, A. B. Dick Co.; treasurer, **W. F. Arnold,** vice president, Underwood Corp.; and executive secretary, **E. D. Taylor.** The last two named were re-elections.

—o—

George Campbell, manager of the Buffalo office of the apparatus department, General Electric Co., has retired after 41 years of service. **W. J. Woods,** formerly in charge of the Buffalo office's Industrial Division, succeeds Mr. Campbell.

—o—

Carl L. Radway has been appointed division superintendent, cold rolling mills at the Cuyahoga Works, Cleveland, by American Steel & Wire Co., a U. S. Steel Corp. subsidiary. He succeeds the late **C. M. Sackerson.**

—o—

Stanford P. Bruce has joined Wheel Trueing Tool Co., Detroit, to be in charge of the newly-created "Diamond-Miser" Division, which will operate from the Detroit headquarters. Mr. Bruce is the inventor of the "Diamond-Miser," a mechanical device for predetermining the degree of rotation of wheel dressing diamond tools, automatically or manually.

—o—

A. W. Landel has been appointed manager of construction materials for Connors Steel Co., Birmingham. He succeeds **John L. Callaway,** who resigned to enter his own business as a steel fabricator in Knoxville, Tenn.

—o—

Paul Osusky Jr., a metallurgical engineer, has been placed in charge of sales and research in the metal spraying field of Milwaukee Industrial Development Co. He formerly worked for Allis-Chalmers Mfg. Co., Milwaukee.

—o—

A. M. Byers Co., Pittsburgh, announces appointment of **Buckley M. Byers** to the board, succeeding **George A. Blackmore.**

OBITUARIES . . .

Max Meltzer, 56, vice president and a director of Steel Trading Corp., Pittsburgh, died Nov. 3, following a heart attack. Long prominent in the iron and steel scrap industry, he headed his own scrap concern, the Max Meltzer Co., Pittsburgh, from 1932 to 1938, at which time he joined Steel Trading Corp. During World War I Mr. Meltzer served in a scrap advisory capacity in Washington.

—o—

A. F. Banks, 88, retired president, Elgin, Joliet & Eastern Railway Co., subsidiary, U. S. Steel Corp., died Nov. 7. He retired from the company in 1930.

—o—

Vincent P. MacCarthy, associated with R. D. Wood & Co., Philadelphia, for 25 years, and since 1928 Cleveland manager for this firm, maker of cast iron pipe, valves, fittings and hydrants for water supply and fire-fighting systems, died Nov. 4.

—o—

Chauncey G. Bevin, 96, president, Bevin Bros. Mfg. Co., East Hampton, Conn., died Nov. 7.

—o—

Jerome D. Kennedy, 73, who retired in 1939 as general telephone sales manager for Western Electric Co., New York, died Nov. 4. He was connected with the company for 40 years.

—o—

Dr. William G. Beckers, 74, senior director of Allied Chemical & Dye Corp., New York, died Nov. 3.

—o—

Edward F. Dobson, 53, president, Florence Stove Co., Chicago, died Nov. 1. He was former president of Rundle Mfg. Co., Milwaukee.

—o—

Brig. Gen. William E. Gillmore (ret.), 71, assistant chief of the Army Air Corps in charge of procurement from 1926 to 1930, died Nov. 7. During World War II, Gen. Gillmore was aviation consultant for Briggs Mfg. Co., Detroit, which switched from automobile body production to the manufacture of aircraft parts for the war period.

—o—

J. William Jay, 63, advertising manager for the last 15 years for Henry Disston & Sons Inc., Philadelphia, died recently of a heart attack.

—o—

Vernon D. Buys, superintendent of the service section, apparatus department, General Electric Co., Schenectady, N. Y., died Nov. 5.

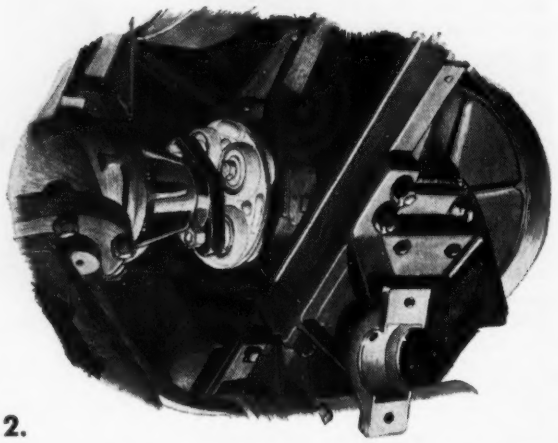
—o—

Arthur Simon, 67, consulting electrical engineer and patent attorney, for many years with Cutler-Hammer Inc., Milwaukee, died Nov. 4.

Want to reap a harvest in your business?

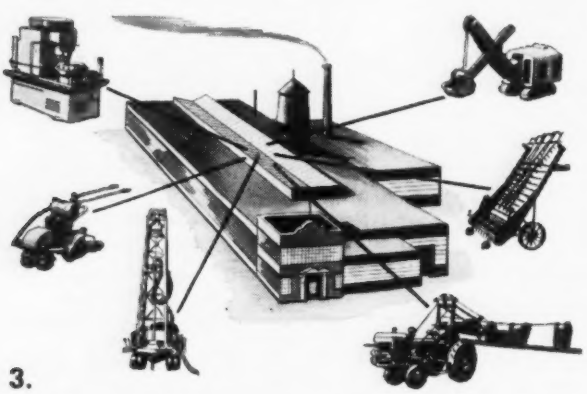
1.

Wanted: a one-man crew to harvest grain in labor-short areas. Cockshutt Plow Co., Ltd., Brantford, Ont., built such a harvesting combine. But trouble-free operation had to be assured on such vital turning parts as the shaft between transmission and differential. Needed: a flexible coupling to absorb shock and vibration, increase shaft life, yet withstand grit, chaff and moisture. Impossible?...



2.

Cockshutt Plow's unusual coupling need was quickly filled by Morse Morflex Couplings. Shockproof, quiet, compact—they take all the kicks the combine gives, *and compensate for misalignment.* Other Morse Couplings—Silent and Roller Chain, 'Junior' and Double Morflex, Radial and Marine Morflex—are made to thresh out particular problems in *your* business. Just...



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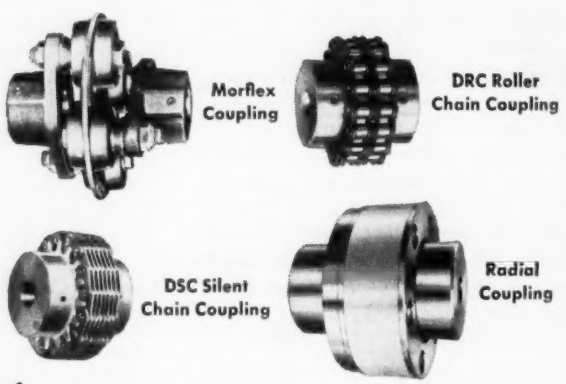

4.

You'll get plenty of bright ideas for coupling uses from a set of Morse coupling catalogs. Address: Dept. 248, Morse Chain Co., 7601 Central Ave., Detroit 8, Mich. Or, for on-the-spot engineering advice and aid, write or wire—trained and experienced Morse Sales Engineers will call on you. Ask to see and hear more about the entire line of Morse Mechanical Power Transmission products.

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Engineering News . . . AT A GLANCE

ISOTOPES IN INDUSTRY— More than 400 projects involving the use of isotopes are currently found in industrial research, chemistry, physics and metallurgy it is estimated. Recently, Ford Motor Co. received a shipment of isotopes for research in determining the gage of steel sheets as they come from the rolls of the hot rolling mills, as a means of locating from outside the cupola just where the slag line is, and when the metal is ready for pouring.

MASS PLATING— More than 60,000 parts per day are plated by the automatic plating equipment currently operated by Moore Drop Forging Co., Springfield, Mass. Automatic cycle of the unit allows for the nickel plating of 264 racks of work per hour. Coating thickness is maintained at 0.0004-inch minimum in accordance with specifications. Following nickel plating, parts are reracked and transferred to an automatic chromium plating unit, cycle of which disposes of the work in a matter of 15 minutes. One hundred fifty-three racks per hour are processed by the second unit, the chromium being applied 0.00001-inch in thickness.

STEAM TEMPERING— Addition of a protective steam atmosphere to the Homo forced-convection heating method familiar to many heat treaters is instrumental in turning out steel parts with a uniform blue oxide finish, according to Leeds & Northup Co., Philadelphia, which developed the technique. High-speed steel tools, cast iron, sintered powdered iron compacts and nonferrous alloys can be treated by the method at temperatures up to 1150° F. Processed parts are free from scale, have improved machinability, increased resistance to corrosion and wear, and are easier to clean for subsequent plating, if required.

DESTRUCTION-RESISTING "BOMBS"— Vessels designed to operate at 7000 pounds per square inch and temperatures of 932° F are produced in the Riverside laboratories of Universal Oil Products Co., Chicago, by machining forgings of austenitic chromium-nickel stainless steel to withstand severe chemical reactions in the petroleum refining industry. Resembling ordnance bombs only slightly in shape, the vessels are enclosed in an inclined position in an electric furnace, rotated by electrically driven chain drive. Because of possible explosions, due to materials used and pressures and temperatures involved, experiments are conducted by remote control in special safety stalls. One special bomb was made to operate at 21,000 pounds per square inch.

"DRY" PLATING PROCESS— Heat is the sole means of deposition in a gas plating process utilizing a gaseous medium, developed by Commonwealth Engineering Co., Dayton, O. Thermal decomposition of metal carbonyls in an inert atmosphere of carbon dioxide is involved in the method. Objects to be plated are radiant-heated in a plating chamber supplied by a metal carbonyl generator. An integral metal coating is quickly obtained at temperatures of about 400° F. The process, it is reported, is applicable to any material that will withstand this temperature, irregular surfaces, complex shapes and articles with internal areas being easily handled. In one operation on continous strip an amount of metal normally requiring 30 minutes to apply by conventional methods was deposited in 4 seconds.

FRAGILE MATERIAL — Carbide is a brittle material and cannot be handled like high-speed steel. Thus, it is pointed out, extreme care is necessary in the storage and handling of carbide-tipped hobs. If the user is equipped for plastic dipping, he should dip all carbide tools after resharpening to help prevent accidental chipping or breaking of teeth. If this is not possible, a wooden box specially made for each hob or cutter should be employed. Boxes should be marked "fragile" so truckers and other handlers will treat them with care when taken to and from machines. (p. 95).

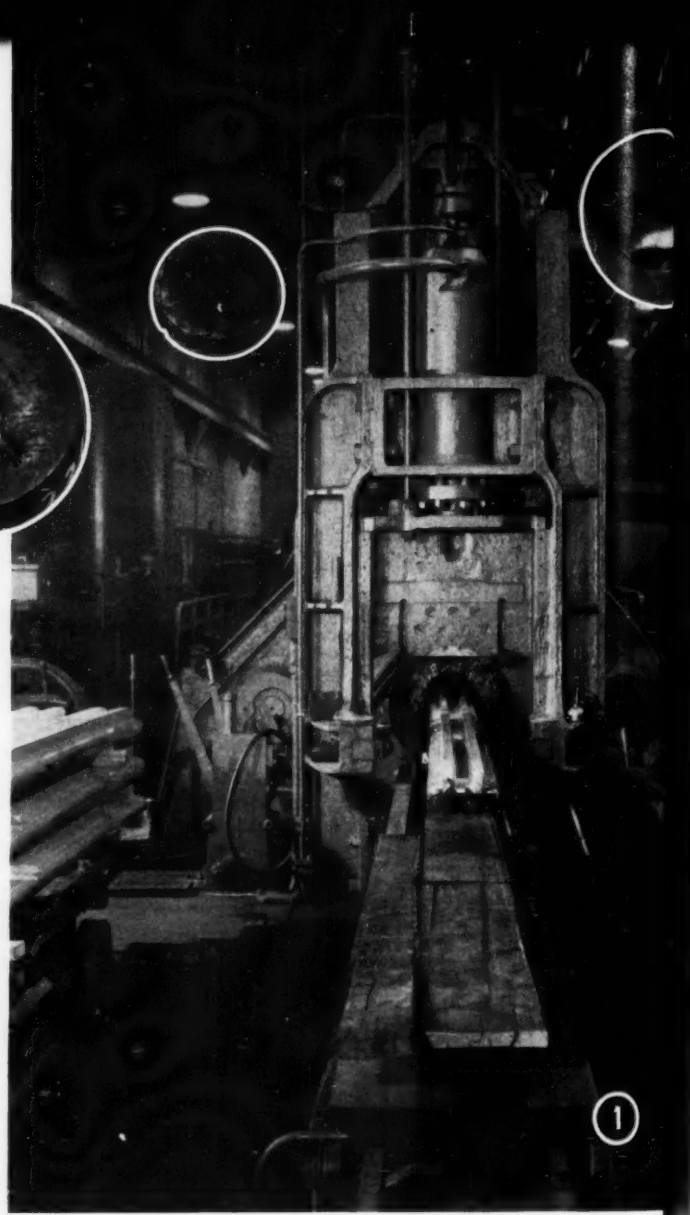
SORBITIC STRUCTURE BEST — Initial microstructure is of particular importance for steels to be surface hardened by high-frequency induction heating, according to Dr. Joseph F. Libsch, consulting metallurgist, Lepel High Frequency Laboratories. Specifically, he states, the nature and distribution of the ferrite-cementite aggregate determines whether or not the steel will respond satisfactorily to induction heating. For medium carbon steels an initial sorbitic structure appears most suitable. Presence of massive free ferrite appears to be particularly objectionable and must be avoided in critical parts to be case hardened with a minimum depth of case. (p. 97).

DOUBLE MISSION — Process of electropolishing tends to supplement rather than replace mechanical polishing, it is emphasized. Comparative metal loss is extremely small, depending on such operational variables as surface condition of the work, length of treatment and current density. Besides producing a highly polished surface, this slight metal loss results in certain other advantages. Surface of the metal is left chemically clean and surface stresses are removed, favoring formation of continuous, strong oxide surface films. (p. 109.)

NITROGEN FIXATION — Although aluminum is added to the steel for purposes of deoxidation in the production of killed bessemer steels, it also is used for nitrogen fixation. According to E. G. Price, vice-president in charge of operations, National Tube Co., Pittsburgh, considerable experimental work is being conducted along these lines. (p.116)

By F. W. BOYNTON
Reynolds Metals Co.
Louisville

New Applications Found for Aluminum Extrusions



As production techniques are refined and product quality consequently improved, extruded aluminum sections are enjoying a wide variety of new uses

APPLICATION possibilities for aluminum extrusions are being explored with increasing vigor as designers recognize the advantages of using extruded sections. Aluminum windows for houses, buses, and buildings have little or no maintenance cost. While the price on aluminum extrusions may range between 30 to 80 cents per pound, the advantages based on the overall cost picture in many cases result in actual savings. Design and manufacture of a special section eliminates the assembly of several individual parts formerly required.

Corrosion resistance of aluminum permits low maintenance costs and fine appearance in style and beauty. In many cases no painting or finishing is required. Close dimensional tolerances eliminate or minimize machine operations.

Aluminum extrusions are easily fabricated and joined by welding, brazing, riveting, plastic cementing, and soldering. Light weight means easier handling, lower assembly costs, and a decrease in dead weight. Dies are cheap, costing $100 to $200 for typical solid shapes, thus permitting production of small quantities for experimental and developmental work at low cost.

Production Methods—The extrusion process is a method by which material in a plastic condition is formed by forcing it under pressure through a die opening. When heated to the plastic condition (500 to 800° F), aluminum may be forced out through a die opening, using pressures ranging between 500 and 5500 tons. The shape produced depends entirely upon the die. As long as the cross-section desired is uniform, throughout the total length, extrusions are entirely feasible. Since there are limitations of the process, some of the factors which should be considered when using extrusions are worth considering.

To produce extrusions, hydraulic presses capable of exerting tremendous pressures are used. For small sections which may be inscribed in a 4-inch diameter circle, a press capable of exerting 500 to 2500 tons is preferred. Large presses of 3850 to 4000 tons may extrude sections up to those inscribed in a 12-inch diameter circle. Fig. 1 is a photo of a 3850-ton extrusion press with controls, main pressure cylinder, end platen where dies are held, and shear.

Fig. 4 is a schematic diagram showing the heated iron container which holds the aluminum billet while the ram operated from the main pressure cylinder forces the metal through the die. Billet varies in size depending upon pressure exerted by the press, size

Fig. 1—Runout and discharge end of Loewy 3850-ton capacity hydraulic extrusion press
Fig. 2—Extrusion dies

and shape of part and other factors. A typical billet for a 1650-ton press is about 4½ to 5 inches in diameter by 12 to 18 inches long and weighs from 20 to 35 pounds. For a 3850-ton press, a typical billet is 11 inches in diameter, from 22 to 36 inches long, and weighs 190 to 325 pounds. Size of the billet determines the amount of aluminum extruded at one "push".

Oxides formed during the extrusion cycle collect at the end of the billet near the ram. To assure that the extruded shape will have only clean metal, about 10 to 15 per cent of each billet is discarded. The die is mounted in a sliding head that is locked into the end platen during the "push". After a cycle the discard or butt is pushed out of the tool container attached to die. The discard is sheared and the extruded shape is pulled on through to clear the die. On small presses it is possible to extrude 40 to 60 billets per hour. Larger presses operate more slowly. Dies can be changed in 10 to 15 minutes so that it is possible to extrude a wide number of different sections on any press during a single shift. Straightening is probably the most difficult part of the extrusion process because dimensional tolerances are so close. Extrusions are stretched in air or hydraulic stretchers to insure straightness. Sections may also be rolled or formed in dies to maintain minimum tolerances. In some cases hand straightening on flat tables is preferred to assure maximum flatness. The shape of the extrusion of course influences the straightening method.

Variety of Shapes—While many applications have been found, the possible uses of aluminum extrusions have merely been touched. Fig. 3 indicates a few shapes possible. Sections for windows, ladder sides and wings, trim molding, structural shapes, airplane spars, bus frames, truck bodies, stands for motion picture screens, tubing, furniture, lamps, textile machinery, irrigation pipe, jewelry, milk crates and many other good applications have already been made.

Since each section must be designed into the particular application, each extrusion is tailor-made for the intended design. The consolidation of several fabricated parts into one extruded section permits assembly savings that allow engineers and designers to dream up practically any shape. Aluminum extrusions not only maintain structural strength but save weight and cost. Fancy slide fits, dove-tails, mechanical locks and assembled sections are possible and make useful tools for designers.

Extrusion shapes may be classified as simple hollow, and semiclosed; these classifications may be combined in any extrusion to produce the section required. A solid or simple extrusion is a cross section in which no space is enclosed. A hollow extrusion encloses a space or void in the cross section.

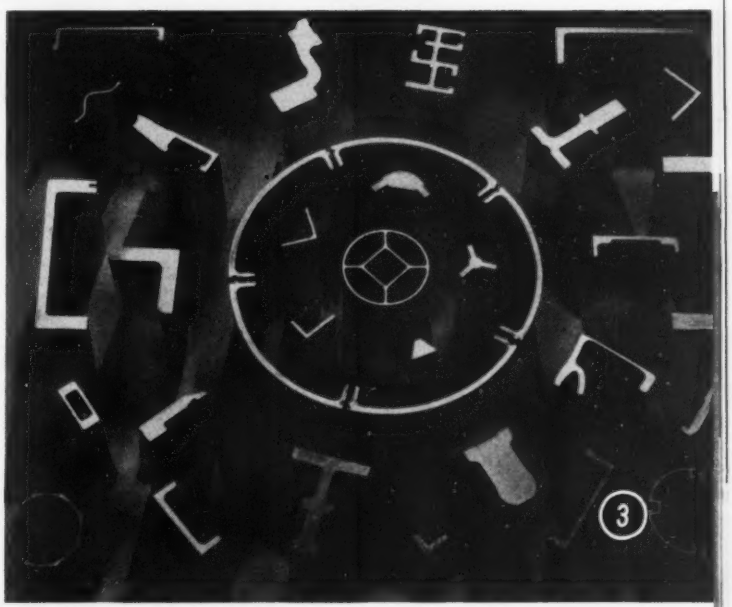
A semiclosed extrusion is a special type of solid extrusion which is not extruded to final desired cross section but is later formed or rolled to the required shape and dimensions by an extra operation. This type is used where there are deep channels or long cavities in the section. Such final shapes could not ordinarily be manufactured because the steel in the die would be too thin to support the pressures used during extrusion.

If in designing an extruded section, the engineer imagines how the cross section will be cut in a steel die, Fig. 2, he will remember that the pressures on thin tongues is measured in tons so that the ratio of tongue length to width is important to prevent die breakage. If the metal of the die supporting a tongue is 1/16-inch wide (dimension "a"), the tongue may be 1/8-inch long (dimension "b"), if 1/8-inch wide it may be 3/8-inch long, or 1/4-inch wide may be 1 inch long. (Above 1/4-inch wide the length of the tongue may be 4 times the width of metal supporting the tongue). Where it is impossible to permit the design of a tongue to these tolerances, it may be possible to spread the metal at the sides of the tongue and later roll the sides of the extrusion to the final shape desired.

Thickness Limitations—Definite minimum thicknesses are commercially possible. These limits are usually based upon size of the cross section (in terms of a circle circumscribing the section). Table I lists minimum thickness with reference to solid and hollow shapes.

It generally follows that a thicker wall is required as the size of the section increases. This is true because friction of the aluminum against die surfaces on large cross sections with thin walls may exceed pressures that dies and presses can exert. This results because pressure required to force metal through a narrow die cavity is greater than for a wider cavity. From the standpoint of straightening, too, the wall should be strong enough to assure that the ex-

Fig. 3—Aluminum extruded parts



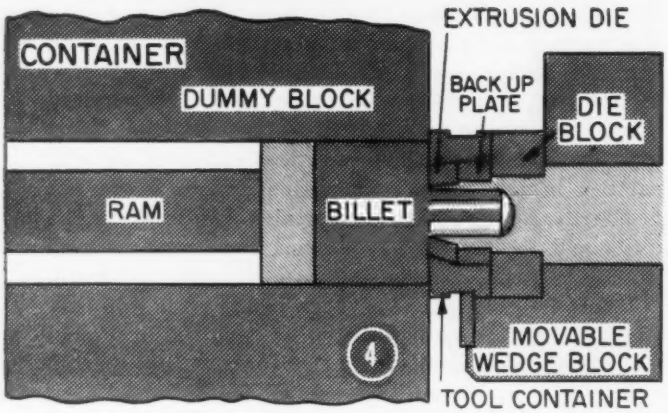


Fig. 4—Schematic diagram showing container ram extrusion die

trusion will maintain its contour during manufacture and use.

Tolerances—Dimensional tolerance limitations depend on number of die surfaces included in the dimension, length of unsupported section and similar factors. Table II shows commercial tolerances on a typical shape. These apply to solid, hollow, and semi-closed sections. A 1-inch dimension in solid metal will be maintained at plus or minus 0.012-inch. However, where 25 per cent or more of the dimension is space (such as the distance across the legs of a channel) a 1-inch dimension will be held from plus or minus 0.020-inch at 1/4-inch from base of legs to plus or minus 0.034-inch at 2.5-inches or more from base. These commercial tolerances may be cut in two at a small extra cost. Where close fits are required, extruded sections may be specified to half commercial tolerance to eliminate machining operations. One of the chief advantages of aluminum extrusions is that dimensional tolerances on irregular shapes may be maintained so that assemblies may be made without extra cost of fitting parts together.

Size Limitations—Generally speaking, aluminum extrusions can be made in cross sections which may be inscribed in a 12-inch diameter circle. The 5500-ton presses can handle sections which are inscribed in a 17-inch diameter circle. Also it is possible to distort some large sections so they can be enclosed in a 12-inch circle, and later straightened to a cross section larger than would ordinarily be expected from a 12-inch circle. Since the number of 5500-ton presses in this country is limited, most work will be limited by a 12-inch maximum circle.

Length of extrusions is limited by shipping and heat treating facilities. Sections 80 feet long have been manufactured. The standard heat treating furnaces are about 20 to 42 feet long and the average railway box car is about 40 to 50 feet. Special arrangements can be made for long lengths up to 80 feet.

Strength to Weight Ratio—Wrought extrusion alloys have been used for wing spars in airplanes and for trim around a table top. The high strength-to-weight ratio obtainable with the strong heat-treatable alloys gives a wide latitude to aluminum. Windows are made in an alloy called 63S-T5 which combines low cost, fine appearance and good strength. Furniture is made in R361-W (61S-W) or R361-T (61S-T) which is more costly than 63S-T5 but is stronger. R361-T has a yield strength equivalent to structural steel. Table trim is usually 63S while wing spars are R303-T, 24S-T, or 75S-T. The stronger alloys cost more but for general use 63S-T5 and R361-T are the most popular.

Surface of extruded shapes is good. Surface roughness tolerance varies with wall thickness. Polishing will produce an excellent surface and any type of finishing treatment such as a satin, etch anodize, color anodize, etc., is possible with minimum amount of work. Trim molding is buffed on automatic machines at fast speeds and low cost. Best results are generally obtained with 63S, 2S, 3S and R361 (61S) alloys.

TABLE I
CROSS-SECTIONAL DIMENSIONS
Minimum Thickness—Inches†

Circumscribed Circle Diameter‡ Inches	Solid Extruded Shapes 3S 63S R361	14S§	24S	R303	Hollow Extruded Shapes 3S 63S	R361
Under 2*	.050	.050	.050	.050	.063	.063
2 to 3	.050	.050	.050	.063	.063	.078
3 to 4	.050	.050	.063	.078	.078	.094
4 to 5	.063	.063	.078	.094	.094	.109
5 to 6	.063	.078	.094	.109	...	...
6 to 7	.078	.094	.109	.188	...	...
7 to 8	.094	.109	.125	.219	...	...
8 to 10	.109	.125	.188	.375	...	...
10 thru 12	.156	.188	.250	.437	...	...

† Applicable to mean thickness if unequal plus and minus tolerances are specified.

‡ The smallest circle that will completely enclose the shape.

§ Minimum thickness of 14S-T is 0.125".

* Minimum thickness less than indicated may be possible for some sections of shapes having a circumscribed circle diameter under 2".

TABLE II
TOLERANCE*—Inches Plus or Minus

Specified Dimension Inches Col. 1	For dimensions taken at a point where 75 per cent or more of the dimension is metal: All except those covered by column 3 Col. 2	Wall thickness§ completely enclosing space 0.11 sq in. and over Col. 3	For dimensions taken at a point where more than 25 per cent of the dimension is space†‡: .250-.624 in. from base of leg Col. 4	.625-1.249 in. from base of leg Col. 5	1.250-2.499 in. from base of leg Col. 6	2.500 in. or more from base of leg Col. 7
Up thru .124	.006		.010	.012	.014	.016
.125- .249	.007		.012	.014	.016	.020
.250- .499	.008		.014	.016	.018	.022
.500- .749	.009		.016	.018	.020	.026
.750- .999	.010	Plus	.018	.020	.022	.030
1.000- 1.499	.012	or	.020	.022	.026	.034
1.500- 1.999	.016	minus	.024	.028	.034	.050
2.000- 3.999	.024	10%	.032	.036	.048	.064
4.000- 5.999	.034	max. ± .060	.042	.050	.064	.088
6.000- 7.999	.044	min. ± .010	.054	.062	.082	.112
8.000- 9.999	.054		.064	.074	.100	.136
10.000-11.999	.064		.074	.088	.116	.160
12.000-13.999	.074		.084	.100	.134	.184
14.000-14.999	.080		.090	.106	.142	.196

* The sum of the tolerances of component dimensions shall not be used as a tolerance for an overall dimension.

† At points less than ¼ inch from base of leg, the tolerances shown in Column 2 are applicable.

‡ Where the space is completely enclosed (hollow shapes), the tolerances in Column 4 are applicable.

§ Where the dimensions specified are outside and inside, rather than the wall thickness itself, tolerance on wall thickness shall be plus or minus 10 per cent of mean wall thickness, max. ± 0.060, min. ± 0.010.

How to Sharpen Carbide-Tipped HOBS

Widespread application of carbides for hobbing nonmetallic gears has resulted in new problems in hob sharpening. Contributing to the complexity of the problems and at the same time spelling the answers are equipment for the job, handling of carbides, selection of wheels, feeds and speeds, methods of truing, dressing and inspecting

ACCEPTANCE and wide-spread application of carbides for hobbing nonmetallic gears expanded very rapidly, once the techniques of manufacturing the hobs themselves were perfected. Then many users were suddenly faced with new and different problems in regard to hob sharpening.

In approaching some of these sharpening problems, the first question should be: "What type of equipment is best suited to do the job?" At Barber-Colman Co., Rockford, Ill., where nearly every type of sharpening equipment is available, carbide-tipped hobs and form cutters are sharpened on either of two machines, depending upon the diameter of the work. Hobs from approximately 2 to 6 inches diameter are sharpened on a No. 6-5 machine. The combination hob, cutter and reamer sharpener is used to sharpen small hobs of approximately 2 inches diameter and less, although it will accommodate up to a 6-inch diameter.

Handling of Carbides—Extreme care is necessary in the storage and handling of carbide-tipped hobs. Carbide is a brittle material and cannot be handled like high-speed steel. If the user is equipped for plastic dipping, he should dip all carbide tools after resharpening to help prevent accidental chipping or breaking of teeth. If this is not possible, he should

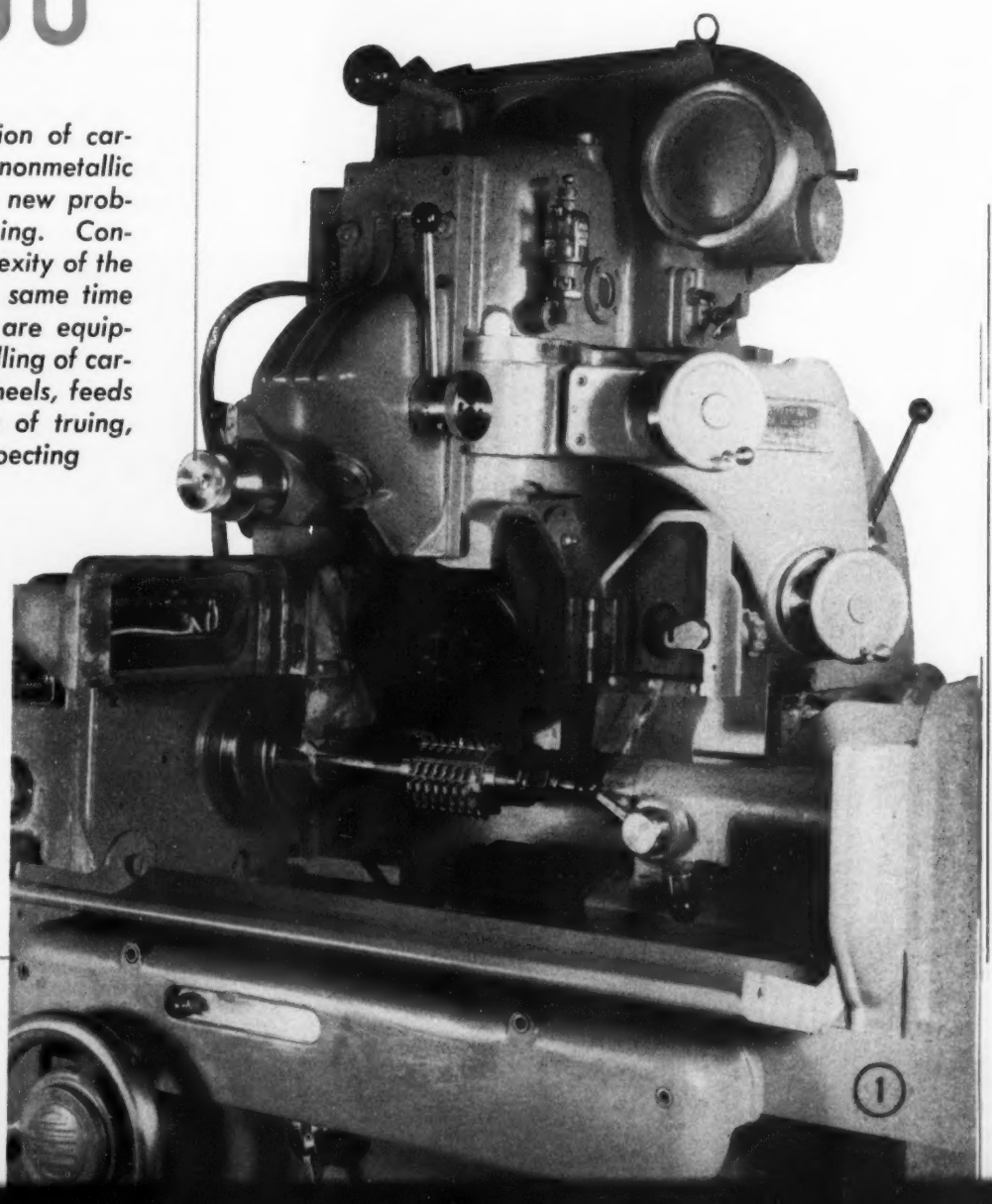


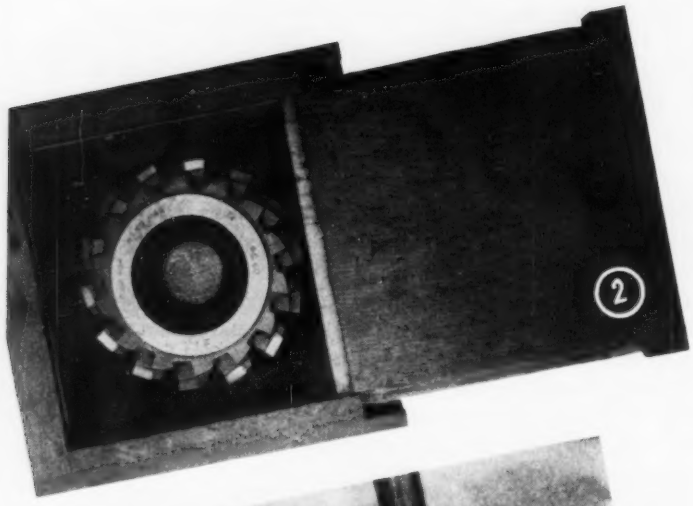
Fig. 1 — Hydraulic grinding machine designed by Barber-Colman Co., Rockford, Ill., for sharpening carbide-tipped hobs with diamond wheels

have a wooden box made specially for each hob or cutter, and it should be kept in this box at all times when not being used on a machine. These boxes should be marked "Fragile" so that truckers and other handlers will treat them with care. All pertinent sharpening information, such as type of wheel, speed, feed, and total stock removal on previous sharpenings, should be kept in this box to aid the operator in setting up for resharpening.

It is imperative that the machine designated to sharpen carbides shall be carefully selected. Furthermore, it must be kept in excellent repair at all times. Poor spindles or any lack of rigidity will make it impossible to do a good job of sharpening. It is equally important that the operator exercise extreme care in sharpening carbides.

High cost of carbide-tipped hobs necessitates attainment of best possible cutting surface and finish with minimum of stock removal. It is false economy to use a hob until it becomes so dull that an excessive amount of stock must be removed to resharpen it. Its carbide tips will be wasted away and the hob will have to be replaced prematurely. Grinding time will also be excessively increased if such excessive dullness is permitted. Maximum number of pieces of work per hob can only be attained if the hob is resharpened regularly and rather frequently. That is true of any carbide tool.

Wheels, Speeds, Feeds—Before an operator starts to resharpen a carbide-tipped hob, he should examine it carefully to determine how much material needs to be removed to eliminate all defects. He can then decide on type of wheel, also whether to use a roughing wheel first or do the whole job with a finishing wheel. It is highly desirable that (*Please turn to Page* 137)



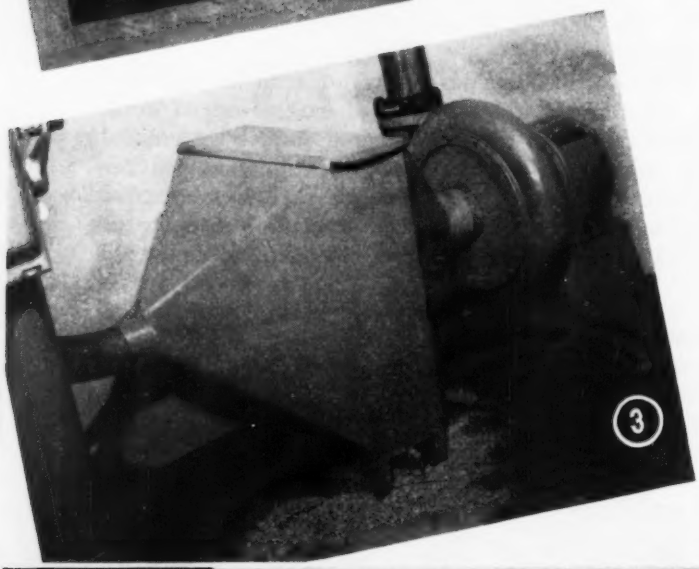


Fig. 2 — Method of protecting carbide-tipped hobs and cutters. Carbides should be kept in this wooden box at all times, except when in actual use

Fig. 3—Special filter removes coolant vapor, thus preventing rusting of ducts of an ordinary dry exhaust system

Fig. 4 — Diamond wheels are dressed by an aluminum-oxide wheel on a tool grinder

HIGH FREQUENCY Induction Surface Hardening

By JOSEPH F. LIBSCH
Consulting Metallurgist
Lepel High Frequency Laboratories Inc.
New York

Development of more efficient equipment, refinement of coil design, better understanding of metallurgical phenomena associated with surface induction hardening have extended use of the process to innumerable steel parts, during the past decade

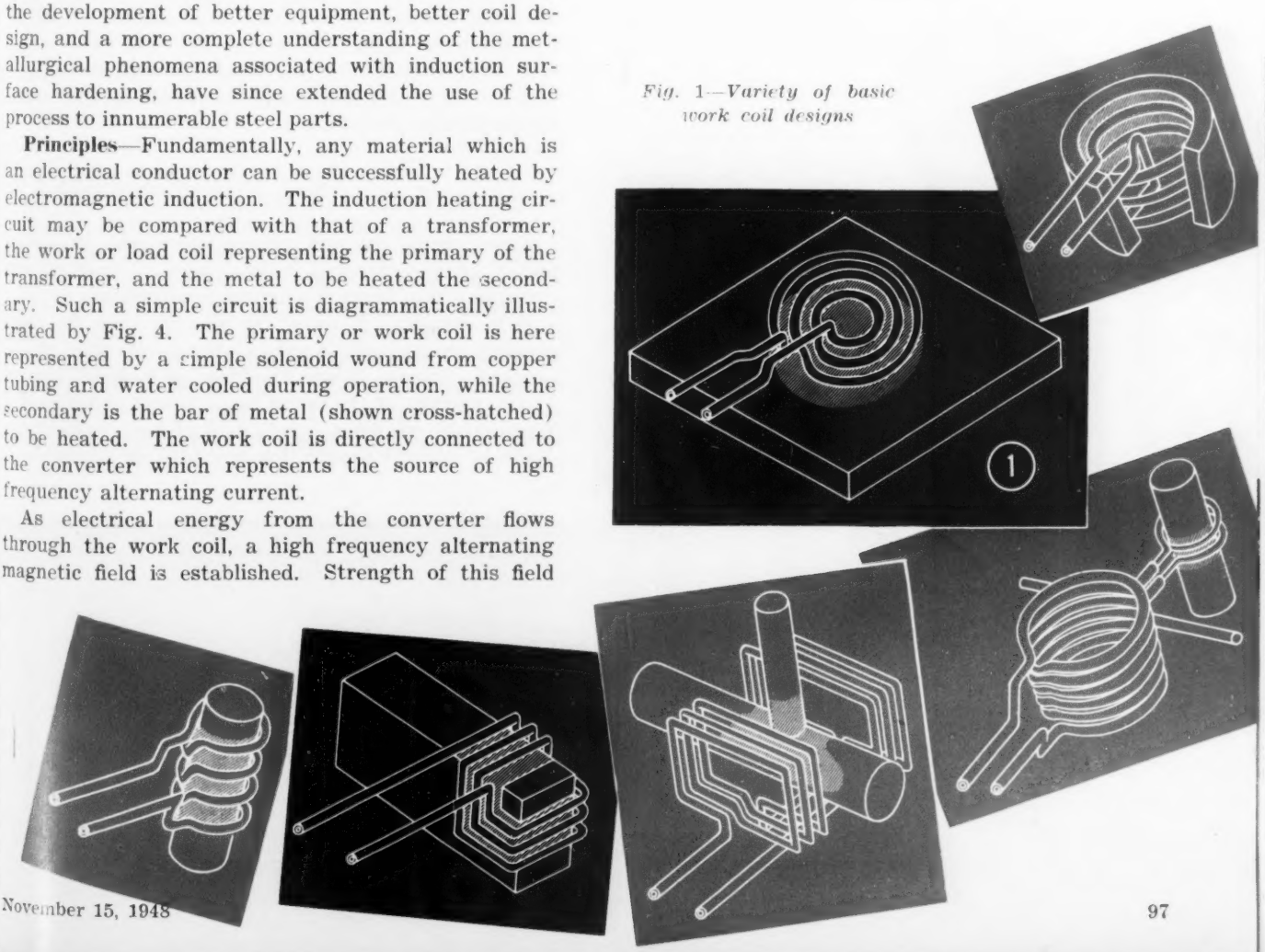
ORIGIN and basis of heating metals by induction may be traced back to Faraday's experiments of 1831, which resulted in the first transformer and the realization of the phenomenon of electromagnetic induction. The early development and use of induction heating, however, was concerned primarily with melting which was accomplished with relatively low frequencies. It was not until the early part of the present century that E. F. Northrup suggested the use of higher frequencies, and thus paved the way for high frequency induction surface hardening.

First important commercial application of this method of surface hardening dates back to about 1935, when the journals of crankshafts were successfully induction hardened. Success of this application, the development of better equipment, better coil design, and a more complete understanding of the metallurgical phenomena associated with induction surface hardening, have since extended the use of the process to innumerable steel parts.

Principles—Fundamentally, any material which is an electrical conductor can be successfully heated by electromagnetic induction. The induction heating circuit may be compared with that of a transformer, the work or load coil representing the primary of the transformer, and the metal to be heated the secondary. Such a simple circuit is diagrammatically illustrated by Fig. 4. The primary or work coil is here represented by a simple solenoid wound from copper tubing and water cooled during operation, while the secondary is the bar of metal (shown cross-hatched) to be heated. The work coil is directly connected to the converter which represents the source of high frequency alternating current.

As electrical energy from the converter flows through the work coil, a high frequency alternating magnetic field is established. Strength of this field

Fig. 1—Variety of basic work coil designs



. . . Induction Surface Hardening

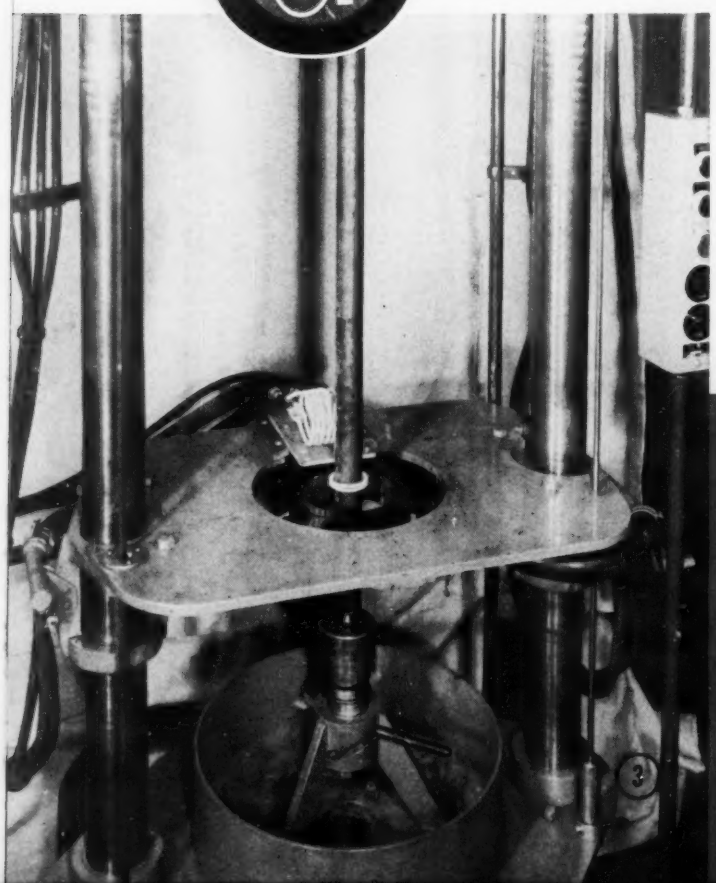
Fig. 2—Variation in case depth produced at a single frequency (approximately 300 kilocycles per second) by varying the time cycle; SAE 1045 steel, 1⅛-inch diameter, kilowatt input 29.6. Depths of case are: (A) 0.035, (B) 0.062, (C) 0.086, (D) 0.129, (E) 0.157-inch. Rate of feed per second (A) 0.190, (B) 0.125, (C) 0.085, (D) 0.075, (E) 0.070-inch

Fig. 3—Closeup of fixture designed for progressive surface hardening

Fig. 4—Induction heating circuit may be compared with transformer; work coil represents the primary and metal to be heated the secondary

Fig. 5 — Hardness penetration curves by induction hardening at 825° C

Fig. 6 (A)—Microstructure of SAE 1050 steel resulting from furnace cooling; (B) structure after quenching from 800° C and tempering 1 hour at 500° C.



will depend upon the magnitude of the current flowing and the effective number of turns in the work coil. The magnetic field thus established, in turn, induces a flow of energy within the bar of metal. This action has been described by previous investigators, and is summarized by the following equation:

$$(1)\quad \Delta P = \frac{KI^2N^2\sqrt{puf}}{8}$$

ΔP = power dissipated as eddy currents
K = constant
I = coil current
N = effective no. of turns in the coil
p = resistivity of change
u = permeability of change
f = frequency

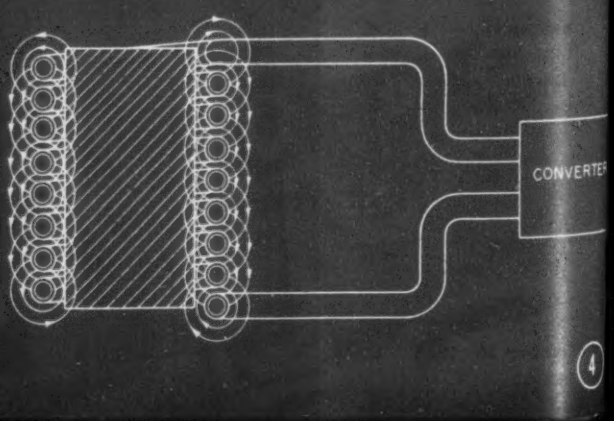
If the metal being heated is nonmagnetic, heating occurs primarily as the result of eddy current losses. If the material is magnetic, heating occurs by hysteresis losses caused by the rapidly alternating magnetic field, as well as by eddy current losses. The exact proportion of the total heat developed in a magnetic material, by hysteresis losses on the one hand and by eddy current losses on the other, is difficult to ascertain; for it depends upon the flux density of the magnetic field developed, the frequency, and the size of piece being heated. It should be pointed out, perhaps, that eddy current losses will be the major factor in heating most nonferrous metals as well as ferrous materials above their Curie point.

Of primary importance for induction surface hardening, is the fact that high frequency current tends to pass at the surface of the conductor. This phenomenon has been termed the "skin-effect". Depth of current penetration varies directly with the square root of the resistivity, and inversely with the square root of the permeability and frequency as expressed by the following equation:

$$d = \frac{1}{2\pi}\sqrt{\frac{p}{uf}} = \text{depth of penetration of current}$$

Since resistivity and permeability will be determined by the material being heated, frequency will determine the depth of current penetration.

It is essential, however, to observe that the relationship shown applies only to the penetration of the induced current. Since the flow of induced energy at the surface of the metal heats it and establishes a temperature gradient, conduction of heat beyond the depth of current penetration immediately takes place.



Total depth of heat penetration, therefore, depends both upon the frequency employed and the time allowed for conduction. Since this time is defined by the heating cycle and depends primarily upon the power available from the converter, this power and the frequency become the most important independent variables in controlling the depth of the hardened case. At frequencies in excess of 100 kilocycles per second; and for normal commercial applications the effect of frequency upon the total depth of heat penetration becomes small, and the heating cycle as determined by the power available becomes the controlling variable.

Fig. 2 shows the variation in case depth produced at a single frequency (approximately 300 kilocycles per second) by varying the time cycle. Results shown were obtained on 1⅛-inch diameter shafts of SAE 1045 steel progressively heated by induction and quenched for hardening. While the power input to the converter was maintained constant at 29.6 kilowatts, rate of feed through the coil was decreased as indicated, thus increasing the heat cycle for a given shaft.

Equipment—Equipment for high frequency induction surface hardening may be conveniently divided into four categories: (1) Converter, (2) work coil, (3) heat treating accessories and (4) control auxiliaries.

Principle types of commercial converters available, their normal frequency range, and normal power capacity, are shown in the accompanying table.

Fig. 1 shows a variety of basic work coil designs, from the simple, efficient solenoid type, to the more complicated pancake or pie-wound and transformer types. Many variations in shape are associated with each basic coil design. The coils are normally made from copper tubing and water-cooled, although with motor-generator equipment single loop heavy caster forged copper work coils are often used. The work coils made from copper tubing are readily shaped on hardwood forms with simple hand tools.

Principal heat treating accessories used for induction surface hardening are quench rings, and holding, rotating or translating fixtures. Fig. 3 shows a closeup of a fixture designed for progressive surface hardening; i.e. continuous progression of the work through the work coil for local heating followed by continuous local quenching. This fixture provides simultaneous rotation and translation of the work piece

EQUIPMENT RATINGS

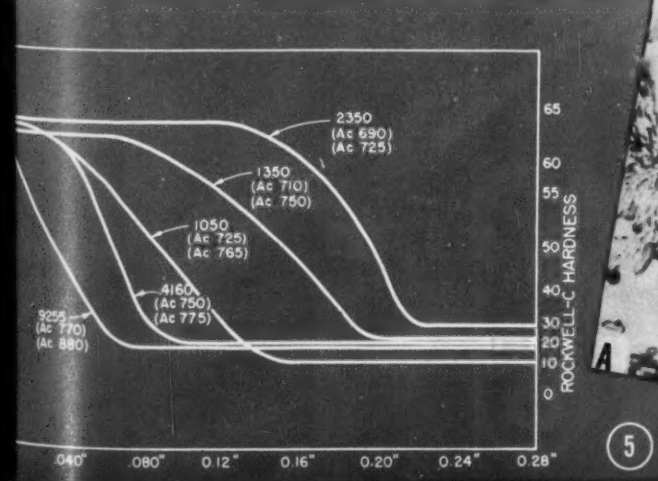
Converted Type	Frequency Range Kc/SEC.	Normal Power KW
Motor-Gen.	1–10	20–500 (up)
Spark Gap		
H_2–H_2	20–80	3–40
Quenched	100–450	3–30
Tube	500–1500	5–50 (up)

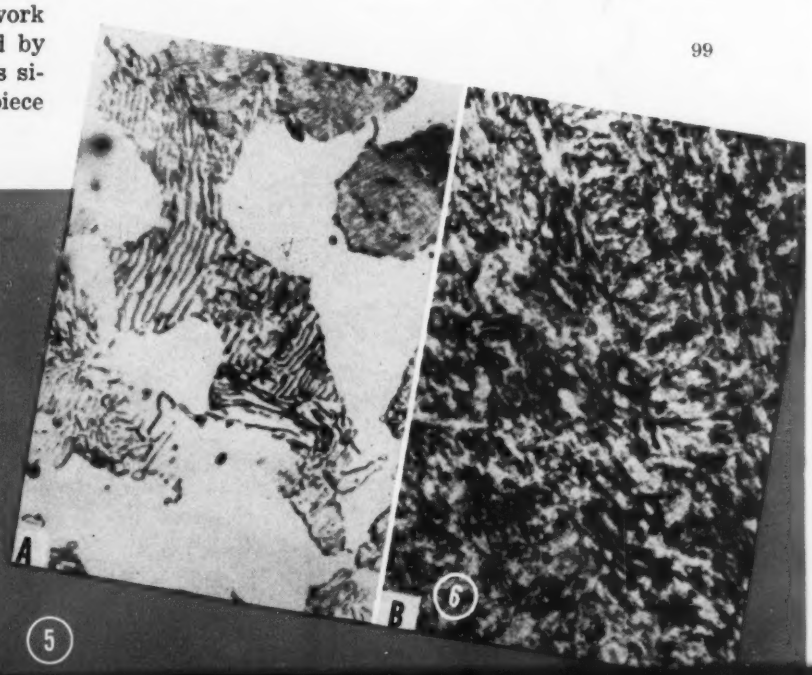
if desired and various rates of feed. Piece in position is to be surface hardened. Coil and quench ring are clearly evident.

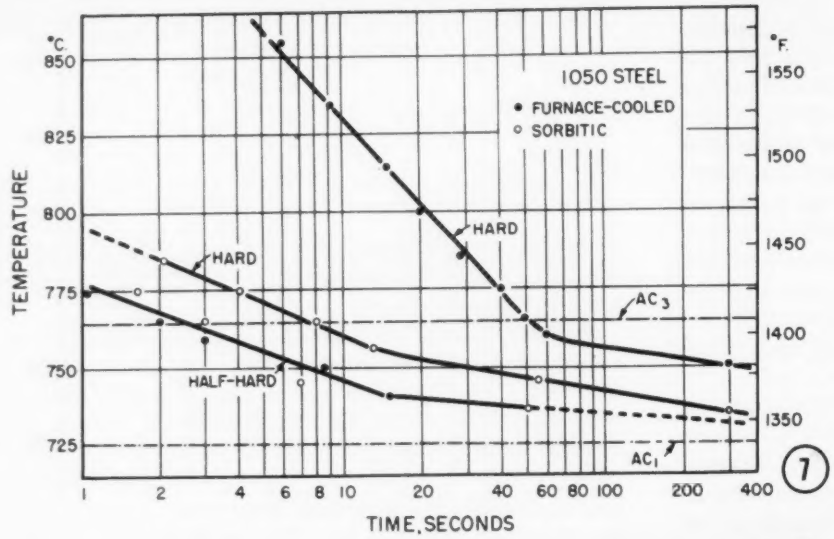
Primary control accessories are those pertaining to the control of the heating and quenching cycles. Automatic cyclic timers are normally used for this purpose, and a time cycle proved indirectly by metallurgical examination or otherwise is repeated continuously. Recently, however, apparatus has been developed and used for controlling temperature of the heating operation directly, and for providing a means to maintain a desired temperature of heating for any desired period of time. This technique, employing thermocouple wires individually welded to the surface of the part, and a modified Leeds & Northrup Speed-O-Max type G recording instrument proved successful in laboratory application at heating rates up to 750° F per second.

Metallurgical Aspects—From the principles previously discussed, it is apparent that providing a hardened case by high frequency induction heating involves (1) selective heating of the surface of a steel part above the upper critical temperature, and (2) quenching at a rate sufficient to avoid high temperature transformation products. If these conditions are obtained and the proper steel is used, a hardened case of controlled depth can be produced about a cone whose mechanical properties may be varied over a wide range by prior treatment.

Metallurgically, these heating and quenching operations are concerned with the mechanics of austenite formation and decomposition in the same general way as are conventional hardening practices. Two factors unique to case hardening by high frequency induction heating, however, make a review of the formation and decomposition of austenite associated with induction surface hardening very interesting. These factors are







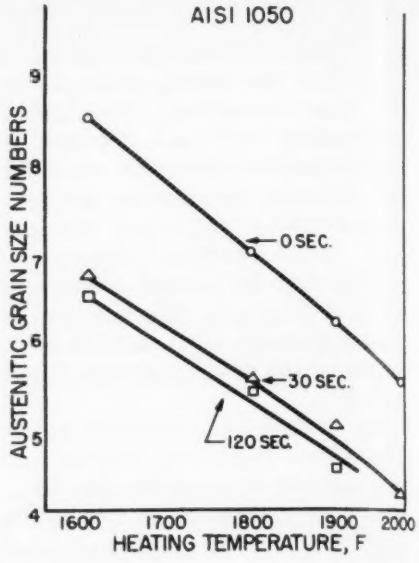
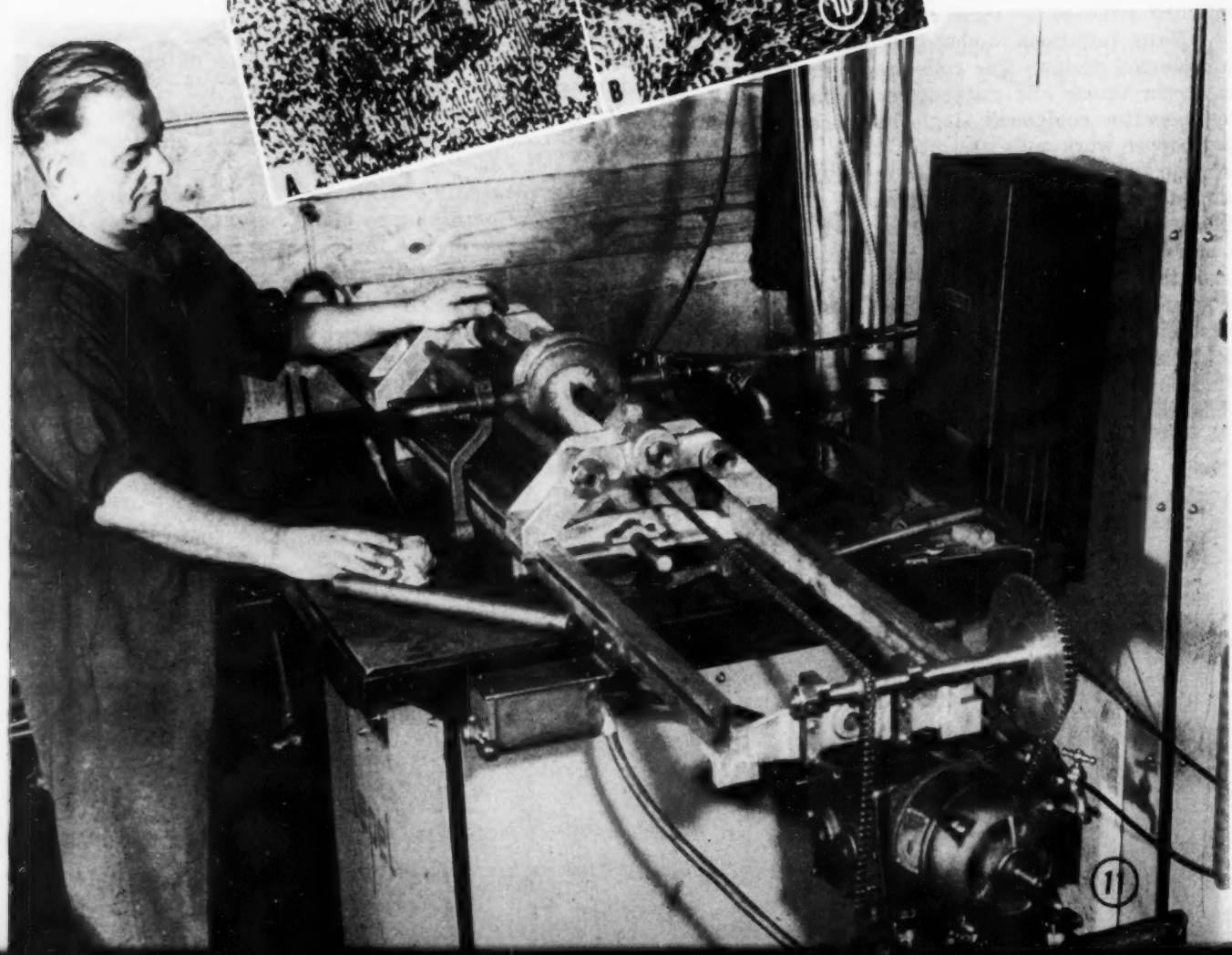
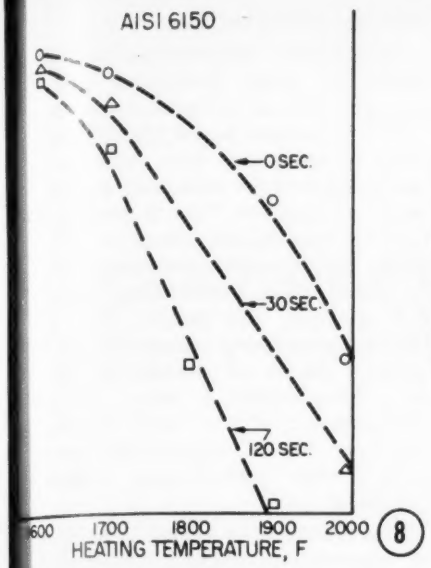


Fig. 10 (*A*) — *Structure of lamellar pearlite in steel before heating and quenching;* (*B*) *structure of pseudomorph of pearlite in steel after heating and quenching*

Fig. 11—*Production surface hardening* 1⅛*-inch diameter shafts of* 1045 *steel progressively. Courtesy U. S. Axle Co.*





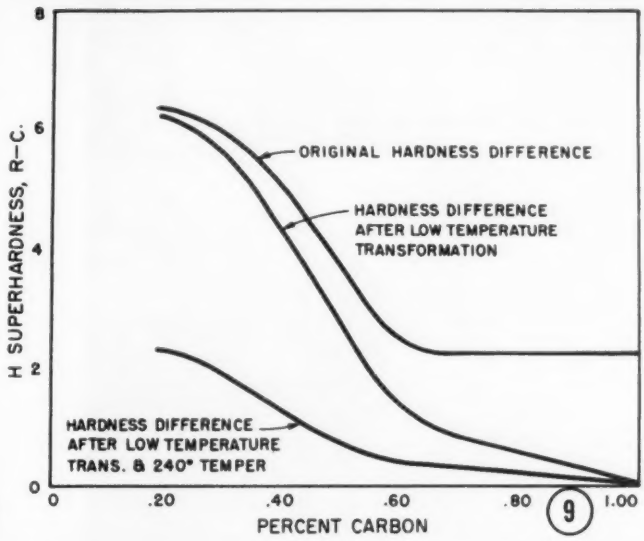


Fig. 7 — Austenitizing TTT diagram for SAE 1050 steel. Initial structures compared in Fig. 6

Fig. 8—Effect of temperature and time on austenitic grain size specimens heated by induction

Fig. 9—Hardness difference after various thermal treatments

...Induction Surface Hardening

an exceedingly rapid heating rate and zero time of holding at the hardening temperature prior to quenching. These combined factors provide a minimum of time for austentization of the steel being heated and are probably responsible for a number of unusual observations reported from time to time by various investigators. Effect of these factors upon the metallurgical results produced, can be explained by considering their effect upon the formation and homogenization of austenite; no new fundamental metallurgical principles need to be considered.

Selection of Steel—Medium carbon steels are normally selected for high frequency induction surface hardening. Such a carbon content is necessary since no elements are added to the surface of the steel during heat treatment, and the final hardness after quenching is therefore dependent upon the original carbon content of the steel. Hardness values of R "C" 62/64 are readily obtained with steels containing 0.50 per cent carbon when they are properly heated by induction and quenched. At the same time, the medium carbon content provides a maximum degree of toughness and ductility associated with the high hardness.

For most surface hardening applications, plain carbon steel (i.e. AISI 1050) is most suitable. This is particularly true where minimum case depths are desired and parts are progressively hardened.

Engineering alloy steels, however, can be successfully surface hardened by induction heating and become essential when it is necessary to provide a very deep case or when through hardening a heavy section. Effect of the various alloying elements appears to be related primarily to their effect on the microstructure, and to the critical temperatures. Steels with low critical temperatures and little or no free ferrite are most suitable. Effect of alloying elements upon the hardenability of the steel is of minor importance, provided the hardenability exceeds a certain minimum required to prevent soft spots in the hardened case. These facts are demonstrated by Fig. 5, which shows hardness penetration curves for several steels surface hardened by induction. Data for these curves were taken from the paper, "Induction Hardening and Austenitizing Characteristics of Several Medium Carbon Steels," by Martin and Van Note, ASM Trans. 1946. For a constant austenitizing temperature of 825° C, the effect of lower critical temperatures caused by the alloying elements nickel and manganese is evident. Also, there appears no relationship between the response of the steel to surface hardening by induction and the conventional hardenability established for end-quench specimens.

For very thin case depths, nature of the alloying elements, whether they are classed as "carbide-formers" or "ferrite-strengtheners", appears of primary significance. Steels containing strong carbide forming elements, such as chromium, molybdenum, etc. respond with difficulty to the rapid heating cycles, and it is doubtful whether sufficient alloy is dissolved in the austenite to produce the desired effect of the alloy. It appears that lack of carbide solution in the austenite may actually reduce the carbon content of the austenite sufficiently to produce low hardness readings after quenching. While higher austenitizing temperatures can be used to increase carbide solution rates, without prohibitive grain growth, the higher temperature usually results in a deeper case.

Prior Structure—Initial microstructure is of particular importance for steels to be surface hardened by high frequency induction heating. Specifically, the nature and distribution of the ferrite-cementite aggregate determines whether the steel will respond satisfactorily to induction heating or not. For medium carbon steels an initial sorbitic structure appears most suitable. The presence of massive free ferrite appears to be particularly objectionable and must be avoided in critical parts to be case hardened with a minimum depth of case.

Figs. 6 and 7 illustrate the effect of initial micro-

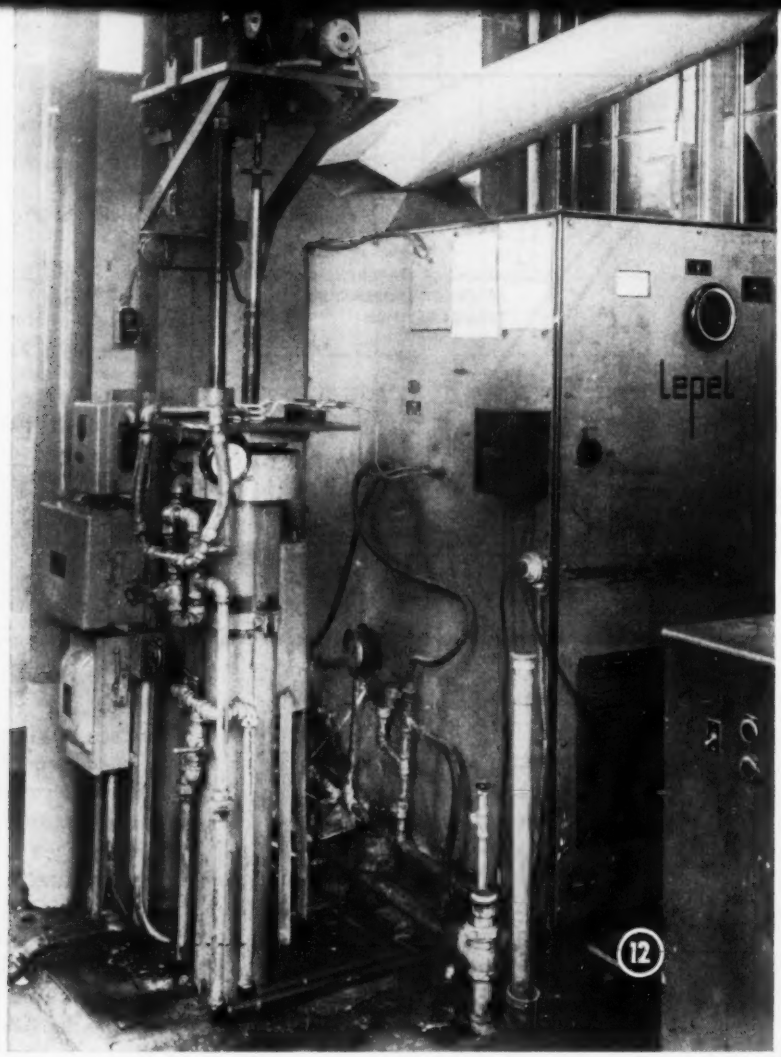


Fig. 12—Equipment used in progressively surface hardening teeth of long lead screws used in precision machine tools

structure on the response of an SAE 1050 steel to austenite formation. Fig. 6(a) shows the structure resulting from furnace cooling, while 6(b) shows the structure after quenching from 800°C and tempering 1 hour at 500°C. Time and temperature required to develop maximum hardness for each of these specimens is shown by the austenitizing TTT diagram of Fig. 7. The results shown are those of Martin and Van Note and while specimens represented by this figure were heated in lead, results are particularly applicable to the short austenitizing times associated with induction heating. It will be noted that at an austenitizing temperature of 800°C full hardness is achieved in the sorbitic specimen after only 2 seconds; while approximately 30 seconds is required for the furnace-cooled specimen.

Austenitic Grain Growth—Extremely short austenitizing times associated with induction surface hardening have a marked influence on the temperature of grain coarsening. Generally, steels may be heated to temperatures 150 to 200°F higher by induction than by conventional methods, while maintaining the same final austenitic grain size.

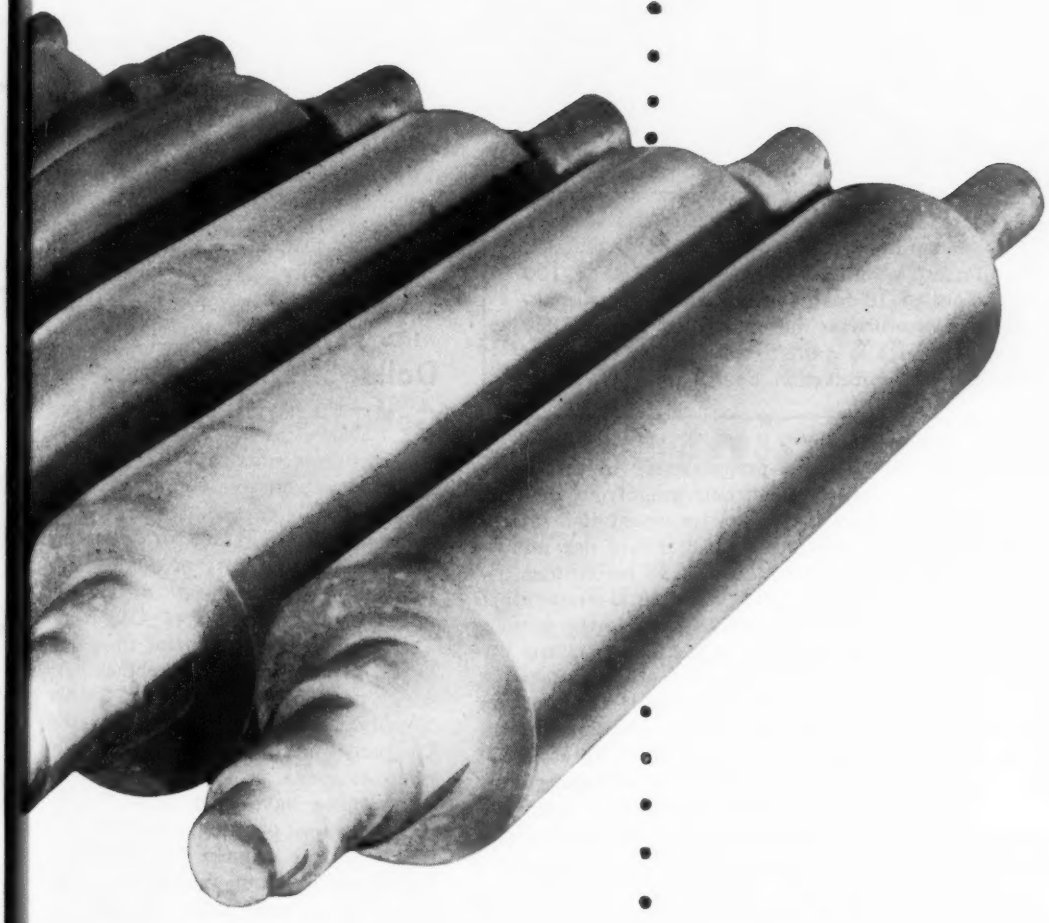
Effect of austenitizing temperature and time on the austenitic grain size established by induction heating is shown for AISI 1050 and 6150 steels in Fig. 8. It will be noted that grain coarsening proceeds as the hardening temperature increases, but that if high heating (normally associated with induction heating) are used, the time at temperature has a marked influence upon the austenitic grain size produced. This is particularly true in the case of the 6150 steel, where at a constant temperature of 1900°F, the final austenitic grain size may be either 4 for parts heated 2 minutes or 7½ for parts heated 0 seconds. Since the austenitizing time provided in normal induction heating cycles is zero, induction case hardening is concerned with the upper curves shown for each steel. Actually the initial microstructive and initial austenitic grain size also appear to affect the final austenitic grain size resulting from the heat treatment.

Since higher temperatures are required to cause prohibitive grain coarsening in parts heated by induction, it is possible to use higher hardening temperatures than those normally specified for hardening by conventional methods. This is fortunate, for to a considerable extent, it overcomes the difficulties associated with extremely short austenitizing times. For example, the shorter time at higher austenitizing temperature provides a degree of carbide solution, and homogenization more nearly characteristic of the longer heating times at lower temperatures associated with conventional heating processes.

Superhardness — Among a number of observations unique to steel surface hardened by induction heating is superhardness, i.e., hardness values for a given carbon content in excess of the maximum values obtainable by furnace heating and quenching. This increased hardness may be as much as 5 to 6 points R"C" at carbon contents of 0.30 per cent and generally becomes less as the carbon content increases.

"Superhardness" has been attributed to the combined effect of less retained austenite, residual compressive stresses and carbon gradients, existing at the surface of induction case hardened parts. An attempt to evaluate the relative effect of each of these three factors is shown in Fig. 9. This compares the hardness differential termed "superhardness" which exists in various steels induction and furnace hardened (a) after quenching (b) after treatment in liquid air and (c) after treatment in liquid air followed by tempering at 240°F. It will be noted that superhardness in high carbon steels is related primarily to less retained austenite in induction hardened steels, while at lower carbon contents residual stresses and carbon gradients appear most influential.

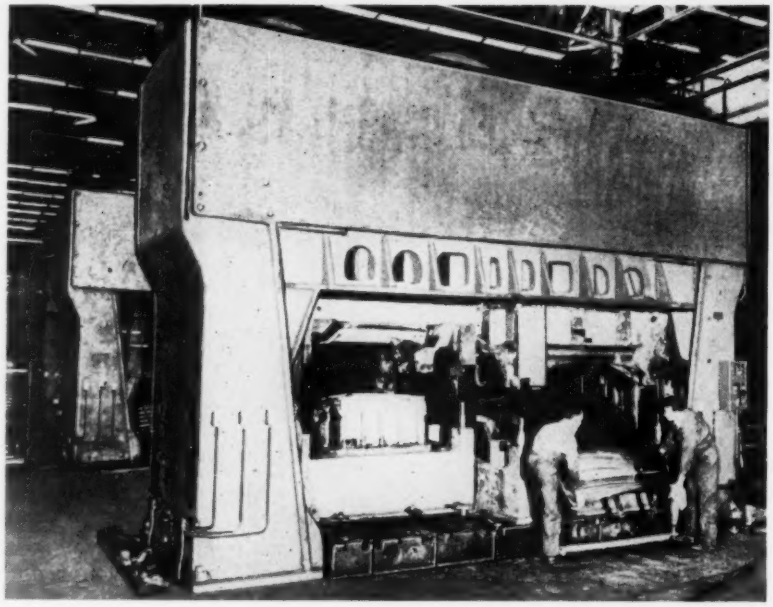
Pseudomorphs of Pearlite—Another observation of considerable interest is the appearance of "pearlite ghosts" or pseudomorphs of pearlite in induction hardened microstructures, particularly in the case of alloy steels. This appearance is illustrated in Fig. 10, prepared from data presented by Ellis in the ASM transactions of 1944. This shows the microstructure of a nickel-chromium molybdenum steel before induction hardening on the left, and after induction hardening on the right. The hardness of the structure on the right is approximately R"C" 62.5. Mechanical properties of such a structure have not yet been reported but the structure



BALDWIN

STANDARD STEEL WORKS DIVISION

The Baldwin Locomotive Works, Standard Steel Works Division, Burnham, Pa., U. S. A. Offices: Birmingham, Boston, Chicago, Cleveland, Houston, New York, Philadelphia, Pittsburgh, San Francisco, Seattle, St. Louis, Washington.



ADDED PRESS CAPACITY: Four electrically operated presses ranging from 900-ton to 1200-ton capacities have been installed in this recently completed addition to City Auto Stamping Co., Toledo, in its $1,600,000 expansion program. The presses, with bed openings of 180 x 100 inches and above-the-floor height of 18 feet, feature four-point suspension to equalize distribution of pressure over the entire bed area. They are mounted on structural steel frames to permit moving, thus affording exceptional flexibility to production operations

offers interesting material for conjecture.

Appearance of such a structure is not peculiar to induction hardening, for it has been observed in high alloy, coarsely pearlitic steel after conventional hardening. Its appearance, however, in normal engineering steels, induction hardened, serves to emphasize the necessity of considering the extremely short austenitizing times in interpreting the metallurgical results related to induction surface hardening.

Applications — Applications concerned with surface hardening by induction heating may be classed into two groups: (a) Progressive hardening and (b) selective on "single-shot" hardening. In progressively surface hardening teeth of long lead screws used in precision machine tools, for example, the primary requirement here is to provide high hardness at the pitch line of the teeth, without causing appreciable distortion over the length of the lead screw, which may be as long as 96 inches. Lead screws hardened by the equipment shown in Fig. 12 vary from 1½ to 1⅝-inches in diameter, and are made from SAE 3250 or NE 8949 steel.

These lead screws are heated progressively in the teeth only, with the coil barely visible in this figure, and quenched progressively in oil immediately upon emerging from the coil. The screws are traversed at a rate of approximately 5.3 inches per minute and are rotated at 15 revolutions per minute, thus providing a temperature of 1500 to 1550°F prior to the quench. The hardened area occurs in the upper portion of the tooth, and does not extend into the root of the tooth or body of the screw. Hardness at the pitch line is equivalent to R"C" 58 to 60. Uniformity of hardening from tooth to tooth is evident.

Equipment used in production surface hardening 1⅛-inch diameter shafts of 1045 steel progressively is shown in Fig. 11. Translation of the shaft is horizontal rather than vertical. While this technique is suitable for many applications, it is believed that minimum distortion is obtained with vertical feed. The quench ring and quench are clearly evident in this figure. The case has a total depth of about 0.135-inch, the hardness being equivalent to R"C" 57 near the surface and for a distance of approximately 0.070-inch below the surface, beyond which the hardness decreases to that of the core gradually.

From the illustrations given, it will be noted that progressive surface hardening by induction heating may be applied successfully to relatively long pieces of uniform cross-section. By simultaneous rotation and translation, together with variations in power input and rate of feed, uniform hardened cases of desired depth may be produced rapidly and with a minimum of decarburization and distortion.

Selective surface hardening, i.e., superficial hardening of selected contours is particularly well adapted to induction heating. It is usually accomplished with a coil conforming to the contour desired hardened, the whole contour being heated at one time and then immediately quenched.

Possibility of strictly limiting the selectively hardened area might be illustrated by a bearing face of a ring made of a medium C steel induction heated and quenched to a hardness of R"C" 57 to 60. The heating cycle would be 4½ seconds, using a power input of 30 kilowatts. The hardened area is limited to the raised bearing surface of the ring, and has a depth of about 0.050-inch. This hardness pattern was developed with a pancake type coil wound to conform with the surface desired, hardened and placed immediately above it.

Dollar-Short Countries Get Tape Printers

Firms in countries finding it difficult to buy in this country because of lack of export dollar credits or because of import duties are being given the opportunity of buying tape printing machines designed and produced by Topflight Tool Co., York, Pa., allowing them to print their own tapes. Heretofore the machines have been made by the company for the Topflight Tape Co. exclusively, this company making the tape for shipment overseas.

Machines have been built for the largest tape printing companies in England and Canada. According to the company, four models are being offered, involving both one and two-color printers. All can be used to print pressure-sensitive adhesive cellophane, acetate fiber, foil, paper and cloth tapes. The policy reportedly will be expanded to present the same opportunity to firms in other foreign countries.

—o—

Better Packages Inc., Shelton, Conn., has published a 64-page book entitled "Gummed Tape User's Handbook," which in addition to discussing the use of tape under normal conditions describes special moistening problems created by high-speed dispensing, heavy tapes, hard and cold water, and various types of carton surfaces.

Electropolishing Stainless Steels

Practical value of electrochemical polishing as a production tool is currently being demonstrated on more than 65 different types of products, parts and assemblies fabricated from stainless steel. Method is designed to supplement, rather than replace mechanical polishing procedures

By ARTHUR P. SCHULZE

THANKS to its unique adaptability for economically finishing certain classes of work too complex or too costly to polish by conventional mechanical means, electrolytic polishing of stainless steels has developed at an astonishingly rapid rate during the past decade. As a result, it now commands an important place among products-finishing operations.

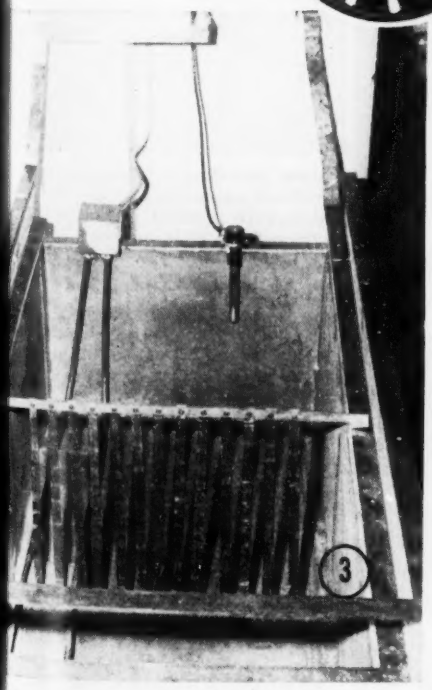
Although known for some time, this brightening technique has been employed until recent years chiefly as a laboratory method of polishing microstructure. But today, with its practical value as a production tool established, electropolishing is being utilized on an extensive and still-expanding commercial scale.

Presently, the method is producing a highly lustrous, mirror-bright, lasting finish on more than 65 different types of products, parts and assemblies fabricated from stainless steel. They range from automotive hardware and household utensils to plumbing fittings and ornametal lighting fixtures. Screws and bolts, wire bas-

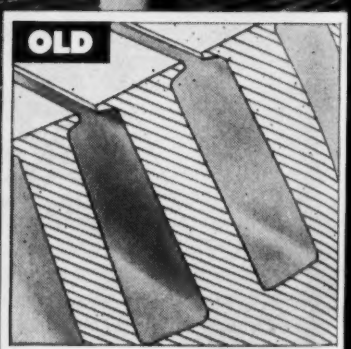
Fig. 1—Operator is rinsing a rack of sink strainer bodies in hot water following submersion in solution of electrolyte contained in tanks at right

Fig. 2—Sink strainer made by Schaible Co., Cincinnati. Perforated strainer shown at right is inserted in body, left

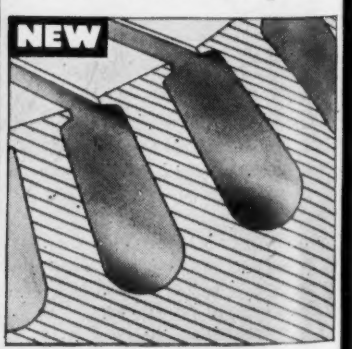
Fig. 3—Two-hundred-gallon electropolishing tank showing heater, thermostat, cathode strips and bus bars for current distribution. All photos courtesy Armco Steel Corp.



Life-Line ..



Usual slot design is rectangular, with sharp corners into which slot cell insulation must be creased and coils must be pushed.



Life-Line slot design is pear-shaped. Coil slips in easily and fills slot—no corner voids remain to collect dirt and moisture.

NEW METHODS . . . NEW MATERIALS . . . OPEN WAY TO LONGER ELECTRIC MOTOR LIFE

An electric motor's "muscle" consists of the "sinews", or coils of wire, packed into slots in the stator of the motor.

If these are "bruised", or cramped or damaged while being put in—or if spaces are left for dirt or moisture to gather—protective insulation breaks down and electrical failures result. *Most motor failures are caused in this way.*

Life-Line—industry's all-steel motor—overcomes these common causes of motor failure. New, pear-shaped slots enable coils to be slipped into place without stress, eliminating need for tapping. No slot corners are left to require creasing of the slot insulation, nor to gather dirt in these voids.

New electrical design is just one of the benefits Life-Line motors bring to builders and users of motor-driven equipment. Get the details on Life-Line's smaller size, lighter weight, greater strength and smoothness.

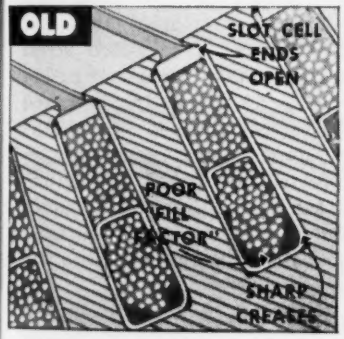
Life-Line motors, now built in sizes from 1-15 hp, are available from stock in standard and near-standard types. "Specials" in Life-Line design are available on short shipment. Other sizes and types—up to 200 hp—soon will be changed over to modern Life-Line design. Check your nearest Westinghouse office for deliveries—or write or wire today to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna.

J-21456

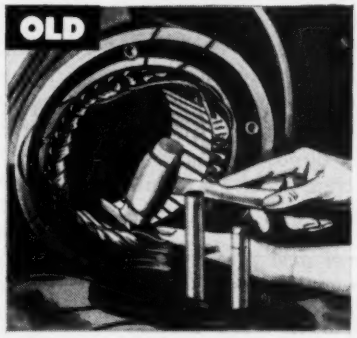
Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

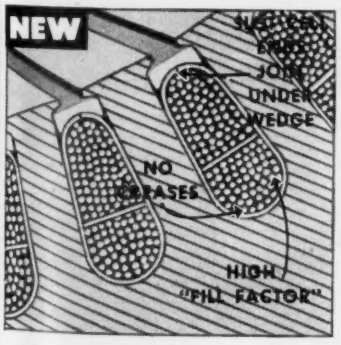
Life-Line motors



Rectangular slot design leaves many unfilled pockets for dirt, dust and moisture to accumulate and cause deterioration.

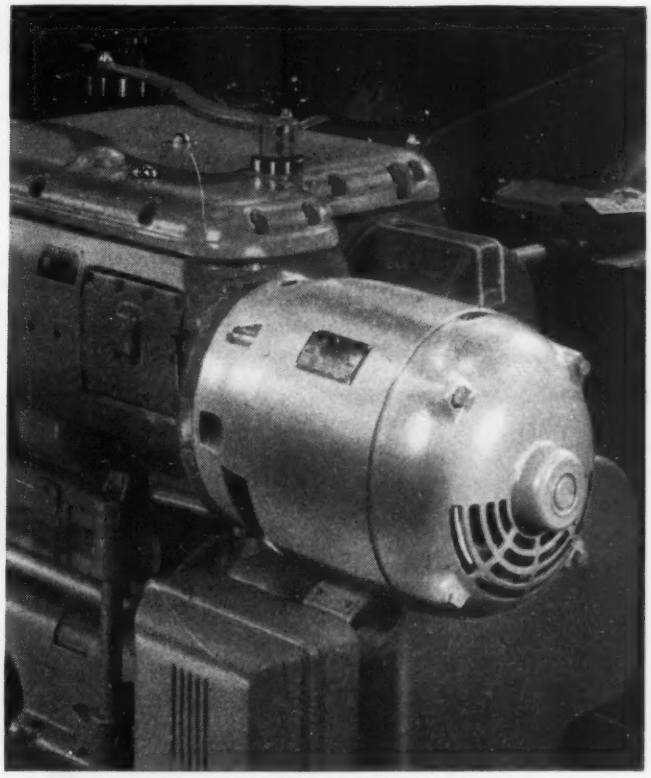


Old slot shape frequently required tapping last wires of the coil into position with resulting possible damage or weakening of insulation.



Pockets are eliminated—cell insulation is lapped over and covered by wedge. No sharp creasing of insulation is necessary.

Life-Line "pear-shaped" slots permit coils to be inserted snugly into position without need for tapping or weakening of the insulation.



LONGER LIFE ON THE JOB with freedom from electrical failures is assured by Life-Line motor manufacturing methods and new insulating materials.

kets, dental instruments, tableware, springs, instrument panels, fish lures, camera parts, electric fan encasements are merely a few of the diverse articles that have demonstrated their suitability for finishing economically by electrochemical polishing.

Polishing stainless steels electrolytically is quite similar in operation to electroplating, but with this one basic exception: Current flow is reversed. In electrodeposition, the work is made the cathode (negative pole of the electrical system) and metal is deposited on the part being plated; whereas in electrolytic polishing, the work is made the anode (positive pole of the system) and metal is removed from the part in process.

Widening the field of stainless finishing, electropolishing is designed to supplement rather than replace mechanical polishing procedures. Comparative metal loss is extremely small, usually from 0.0002 to 0.001-inch, depending on such operational variables as surface condition of the work, treatment time, and current density. In addition to producing a highly polished surface, this slight metal loss results in certain other important advantages. Surface of the metal is left chemically clean and surface stresses are removed, favoring the formation of continuous, strong oxide surface films.

Surface Condition—Brightness and regularity of finish depend in no small measure on the original surface condition of the metal. This factor also may be a basic determinant governing the method's suitability of application from the economy standpoint. Immersion time required to produce optimum results likewise hinges materially on surface condition of work prior to electrochemical polishing.

Smooth, dense, compact surfaces free from scratches and tool marks are most practical since they shorten treatment time, minimize metal removal and facilitate production of a finer polish. Stainless steels of all analyses can be electropolished, but the technique has proved particularly adaptable to the chromium-nickel grades (Type 302, for example) in average plant practice.

Equipment—Basic equipment requirements for electropolishing are relatively simple, closely simulating those which govern chromium plating. These are: Proper processing-solution tank with suitable arrangements for anodes and cathodes, power source and rinse tanks. For current control, the circuit should include an ammeter and rheostat.

Size of processing tanks and power requirements depend on size of product and quantity of output. Generally, lead-lined tanks used to contain the electrolyte range from a few gallons capacity for short-run batch-type operations to fully-automatic units containing thousands of gallons of solution. It is commonly characteristic of larger conveyorized installations, in which the operation is performed on a continuous straight-line production basis and where operating variables have been standardized, to polish numerous parts simultaneously and to secure an identical degree of luster consistently.

Current source is a 6 to 12-volt rectifier or a direct current motor generator. Current density is about the same as for many plating processes, or from ½ to 1.5 ampere per square inch of surface metal at approximately 6 to 8 volts. Different current densities to meet varying work requirements can be secured by changing the applied voltage or distance between work and the cathodes, or both. Varying the immersion period with the current density provides additional flexibility of operation. Sufficient current density is necessary to avoid an etched or frosted appearance. Densities higher than those generally required for polishing provide a more lustrous surface.

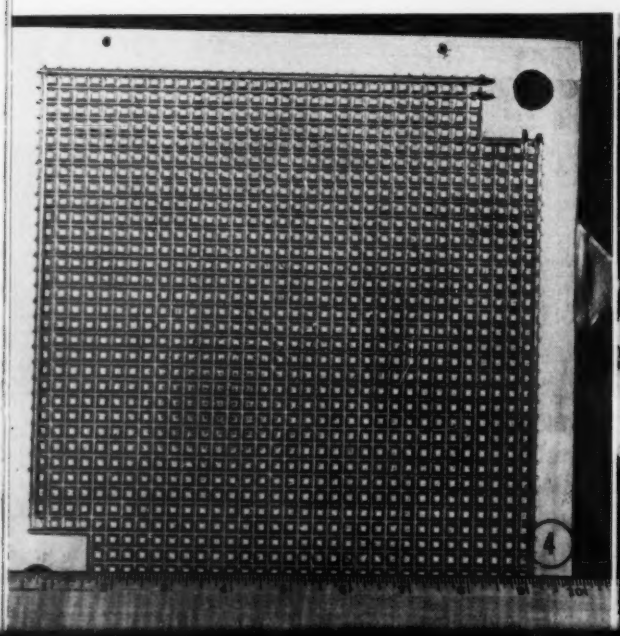
To produce a uniform luster with this brightening process, space between anode and cathode and shape and area of the negative pole require careful determination. Processing deeply recessed articles such as cups or very irregular shapes may require use of a cathode having the same general contour or otherwise suitably shaped to produce uniform current density over the entire area to be polished, and therefore, to obtain the desired degree of uniform smoothness.

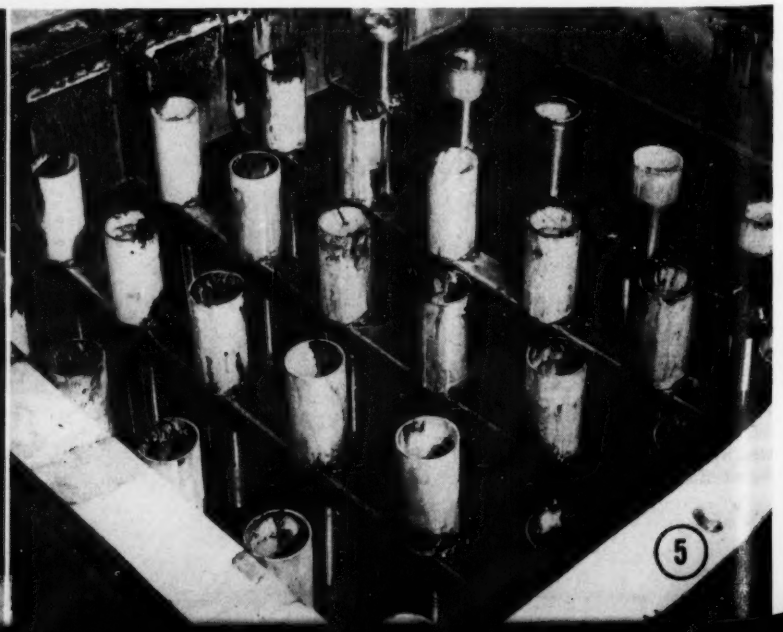
Cathodes are generally made of copper (strips, wire or perforated metal) because of its high electrical conductivity and antifouling properties. With some solutions the tank itself serves as an adequate cathode. For electropolishing units up to 500 gallons capacity, cathodes are usually made of ⅛ x 1-inch metal strips, but for larger units, ¼ x 3-inch strips are more desirable. These strips are suspended vertically in the bath and are adjustable. Sludge is formed during the process and must be removed periodically from the bottom of the tank. For solutions adapted to the use of a reclaim rinse after electropolishing, drag-out losses are minimized.

Treatment Time Varies—Treatment time to produce a given brightness

Fig. 4—Burr-removal and polishing on this machined grid for camera are performed in single simple electropolishing operation

Fig. 5—Electropolishing tank with part of solution removed shows tubular cathodes





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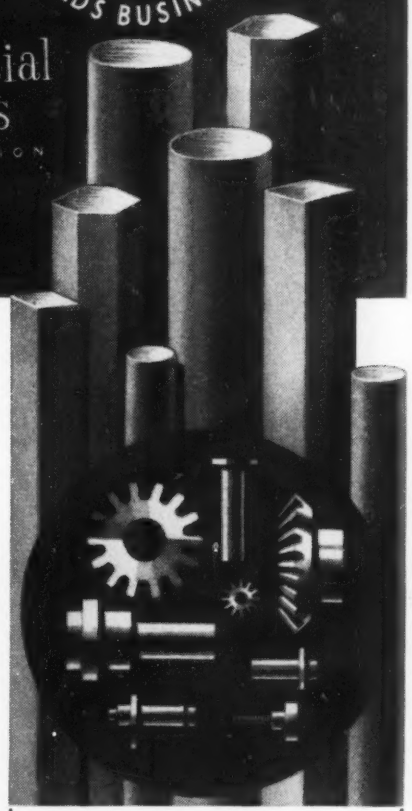

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ranges from 2 to 15 minutes and depends on a number of operational variables, principally: (1) Original surface condition of the metal, (2) shape and size of part to be treated, (3) current density, (4) nature of electrolyte, and (5) temperature at which bath is maintained. On the average, a good bright surface is secured in 2 to 10 minutes at a temperature between 120 and 200° F provided original surface is in satisfactory condition and recommended ranges of current densities are observed.

In the case of rough surfaces which have been sandblasted, hot-forged, cast or rough ground, or with parts heavily discolored or lightly scaled as a result of spot or seam resistance welding, treatment of work for a longer period may be required to produce the desired luster. Prolonged electropolishing will not improve the surface. Metal removal, about 0.001-inch in a 10-minute immersion, is accelerated by stepping up current density.

Surface preparation presents no particularly perplexing problem from the cleaning standpoint. Where work is in fairly clean condition at the outset, no precleaning is necessary, but any grease or oil present should be removed, of course, not only to assure uniformity of the process but also to prevent contamination of the treatment bath.

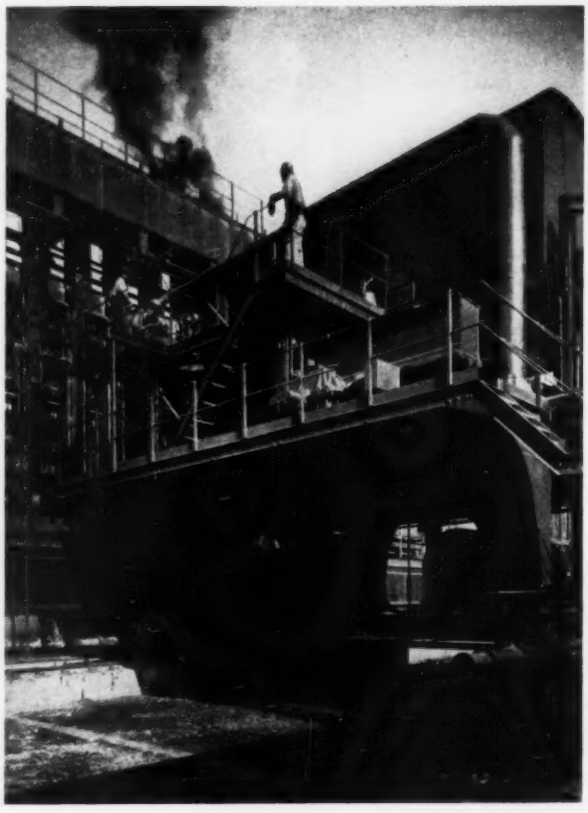
It should also be remembered that failure to remove any supplementary finishes—lime, copper, lead, or cadmium—prevents polishing or results in a rough, unevenly polished surface. So these processing contaminants or deterrents, too, must be removed before electropolishing. For this job, a dilute solution (15-20 per cent by weight) of nitric acid at 120 to 140° F proves effective. As far as grinding marks or deep scratches are concerned, some preliminary mechanical polishing may be required.

Bath Heating—Best bath-heating practice calls for internal heating of solution through acid-resistant electrical immersion heaters or steam coils. External application of heat is definitely not recommended for the simple reason that since sludge formed by an aged solution has an insulating effect, excessive external heat may be required, eventually resulting in solution breakdown.

Volume of solution radiation and exposed surfaces determine number and size of heating elements to be used. A 2000-watt heater or its equivalent has been found sufficient to bring 100 gallons of solutions up to proper operating temperature. Units equipped with thermostatic controls are recommended, as holding the temperature within the operating range proves quite difficult with manually-controlled heaters.

Heat generated in the solution by the electric current during operation helps to keep the bath at operating temperature. Over heating may be caused by too much current for a given amount of solution, however. In a 100-gallon tank, for instance, about 400 amperes represent the maximum amount of current which can

(*Please turn to Page* 145)



GIANT COAL CARBONIZER: Action here shows pusher and coke being ejected at one of the world's largest coke oven batteries built recently by Koppers Co., Pittsburgh, for the Aliquippa plant of Jones & Laughlin Steel Corp., at a cost of more than $12 million. It will make available a monthly coke supply of 53,350 tons. Requiring 77,000 tons of coal monthly, the single battery—arranged in two groups of 53 ovens—will produce over 810 million cubic feet of gas for reheating furnace use, 231,000 gallons of benzol products and a monthly tar output of 730,000 gallons. Nine weeks were required to bring up the oven temperature to carbonizing heat. Once charged, these ovens may be kept in continuous operation for as long a period of time as a quarter century

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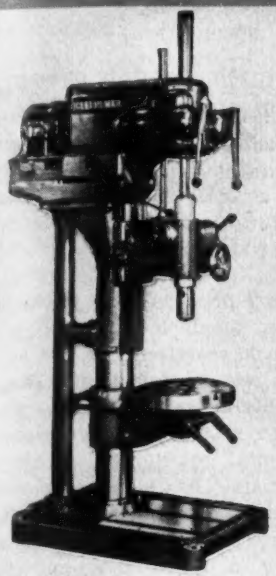

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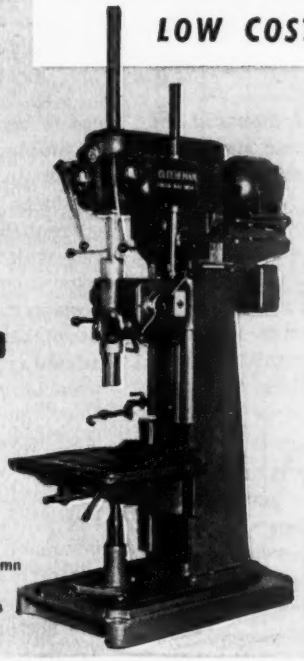
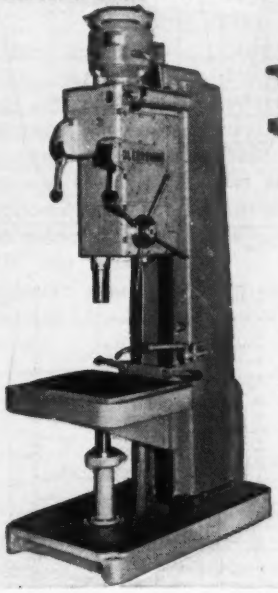
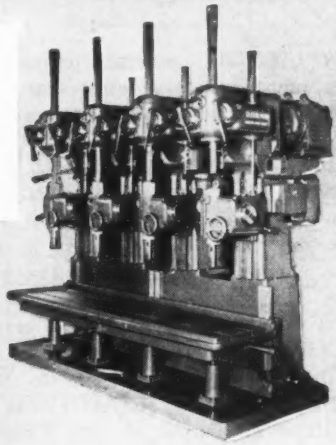


Cleereman Box Column Sliding Head Drilling Machines



Cleereman No. 325 Single Unit Sliding Head Drilling Machine



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ADVANTAGES OF

Bessemer Steel

in producing tubular products

By E. G. PRICE
Vice President in Charge of Operations
National Tube Co.
Pittsburgh

In an integrated plant, cost of making bessemer ingots over a period of years should be less than that of open hearth ingots. During high scrap prices, the bessemer plant has a definite advantage and is in a better position to meet market demands for steel products

PNEUMATIC converter process for the manufacture of steel was independently developed by William Kelly of Eddyville, Ky., and Henry Bessemer of England. Although Kelly did not apply for a patent until 1857, he was able to prove that he had worked on the idea as early as 1847 and a patent was granted. The process is, therefore, over 100 years old. The first bessemer plant was erected in this country at the Wyandotte Iron Works, Wyandotte, Mich., in 1864, although a Kelly converter was experimentally used at the Cambria Steel Works, Johnstown, Pa., as early as 1861.

Basic principles of the process remain unchanged today although many variations and improvements have been made. All bessemer steel produced in this country at the present time is manufactured by the acid converter process while the basic converter process is used in Europe for ingot production and the acid converter process for cast steel.

Early use of converter steel involved a considerable quantity of rail steel. At the present time, the process is used principally in production of duplex steel, butt welded pipe, screw stock, seamless pipe, flat rolled products, and steel castings. Due to current interest in the bessemer process, which is evidenced by extensive experimental work, the future of bessemer steel has many commercial possibilities. The inherent economic advantages of the process are approaching a renewed appreciation. Very large quantities of bessemer steel have been used over a long period of years in the production of butt welded pipe. During the past few years, over a million tons of acid bessemer steel have been used in the production of seamless pipe. It is the purpose of this paper to discuss the bottom blown aid bessemer process in its relationship to the production of tubular products although much of the information is applicable

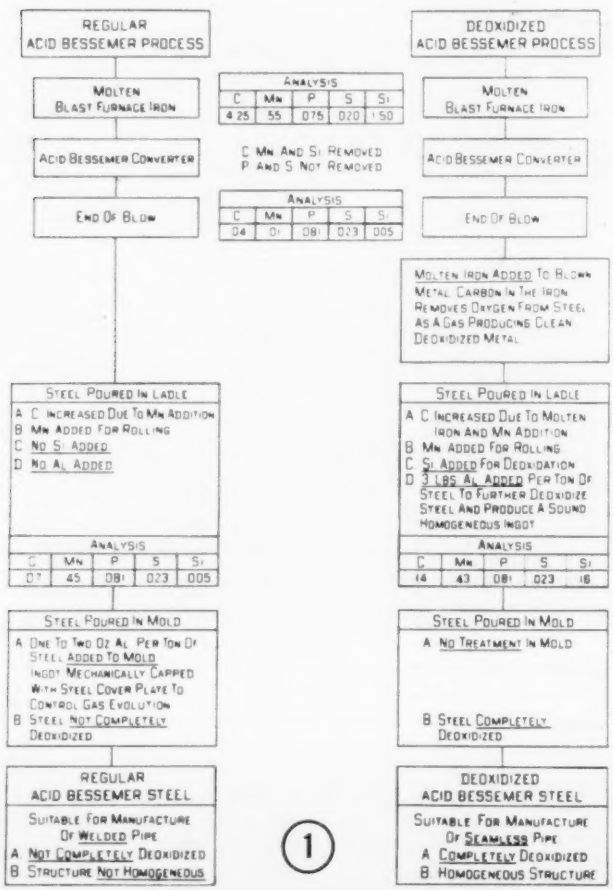

REGULAR ACID BESSEMER PROCESS
MOLTEN BLAST FURNACE IRON
ACID BESSEMER CONVERTER
END OF BLOW
ANALYSIS
C Mn P S Si
4.25 .55 .075 .020 1.50
C MN AND SI REMOVED
P AND S NOT REMOVED
ANALYSIS
C Mn P S Si
.04 .01 .081 .023 .005
STEEL POURED IN LADLE
A C INCREASED DUE TO MN ADDITION
B MN ADDED FOR ROLLING
C NO SI ADDED
D NO AL ADDED
ANALYSIS
C Mn P S Si
.07 .45 .081 .023 .005
STEEL POURED IN MOLD
A ONE TO TWO OZ AL PER TON OF STEEL ADDED TO MOLD INGOT MECHANICALLY CAPPED WITH STEEL COVER PLATE TO CONTROL GAS EVOLUTION
B STEEL NOT COMPLETELY DEOXIDIZED
REGULAR ACID BESSEMER STEEL
SUITABLE FOR MANUFACTURE OF WELDED PIPE
A NOT COMPLETELY DEOXIDIZED
B STRUCTURE NOT HOMOGENEOUS
DEOXIDIZED ACID BESSEMER PROCESS
MOLTEN BLAST FURNACE IRON
ACID BESSEMER CONVERTER
END OF BLOW
MOLTEN IRON ADDED TO BLOWN METAL CARBON IN THE IRON REMOVES OXYGEN FROM STEEL AS A GAS PRODUCING CLEAN DEOXIDIZED METAL
STEEL POURED IN LADLE
A C INCREASED DUE TO MOLTEN IRON AND MN ADDITION
B MN ADDED FOR ROLLING
C SI ADDED FOR DEOXIDATION
D 3 LBS AL ADDED PER TON OF STEEL TO FURTHER DEOXIDIZE STEEL AND PRODUCE A SOUND HOMOGENEOUS INGOT
ANALYSIS
C Mn P S Si
.14 .43 .081 .023 .16
STEEL POURED IN MOLD
A NO TREATMENT IN MOLD
B STEEL COMPLETELY DEOXIDIZED
DEOXIDIZED ACID BESSEMER STEEL
SUITABLE FOR MANUFACTURE OF SEAMLESS PIPE
A COMPLETELY DEOXIDIZED
B HOMOGENEOUS STRUCTURE
1

Fig. 1 — Difference in manufacturing practice for regular and deoxidized acid bessemer steels

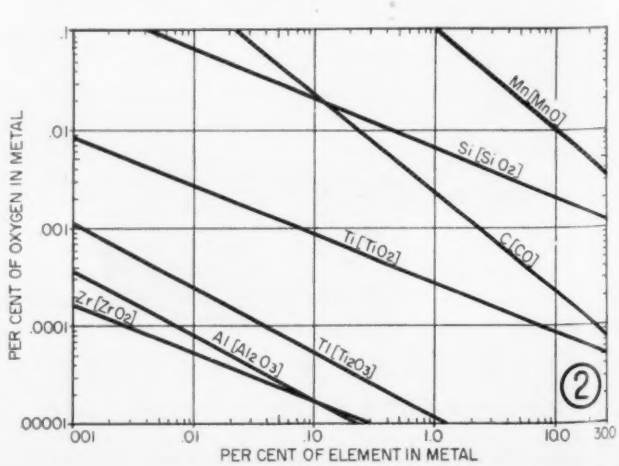


Fig. 2—Equilibrium between oxygen and other elements in liquid steel at 2910 degrees F. (FeO) = 4.49 (O)

Paper presented before American Iron & Steel Institute regional meeting held at Cleveland, Sept. 29, 1948.

to basic and side blown converters.

Investment Costs — The cost of building a bessemer plant is appreciably less than that of an open hearth plant of equivalent capacity. However, greater blast furnace capacity is required in the operation of a bessemer plant as only a small amount of scrap is used in the process. Therefore, investment in blast furnace facilities for a bessemer plant would be greater compared to an open hearth plant. This was probably one of the factors which were responsible for the shift from bessemer to open hearth production during the past forty years.

With proper facilities in an integrated plant, cost of producing bessemer ingots over a period of years should be less than that of open hearth ingots. When a shortage of scrap exists and price is high, the bessemer plant not only has an economic advantage but is in a better position to meet market demands for steel products.

Scrap Market Conditions — Relationship of bessemer to open hearth production is influenced by the availability of steel scrap. The bessemer process uses about 10 per cent scrap while the stationary open hearth process ordinarily employs 35 to 50 per cent.

The bessemer process is more than self-sufficient in scrap as the crop ends in the blooming mill alone produce about 15 per cent. Additional scrap is produced in further processing of the material. The stationary open hearth process produces a similar amount of scrap but constantly uses more than it produces. The deficit is supplied by scrap originating from out-of-plant sources. Production of bessemer steel is apparently not great enough at the present time for correct balance of processes in the steel industry. If the present unbalanced condition, which is related to a shortage of scrap, continues for a sufficient period, economic pressure will bring about conditions which have existed in Europe for many years and will result in increased bessemer production.

Bessemer process has distinct economic advantages when scrap is scarce and costly. However, this should be recognized as only one of the factors as there are periods in our economy when scrap is plentiful and cheap. Therefore, the economic pressure which exists over a period of years will be one of the controlling factors which influence the bessemer steelmaking capacity of the nation.

Metal losses in the bessemer process are comparable with those of stationary and duplex open hearth practice. Depending upon facilities and operating conditions, performance of acid bessemer plants in terms of metal yield has been similar to open hearth plants. This situation with respect to the future should improve in bessemer operations as technological advances are applied. In addition, economic urge to do a better job will make technological gains more firm in their relationship to plant performance.

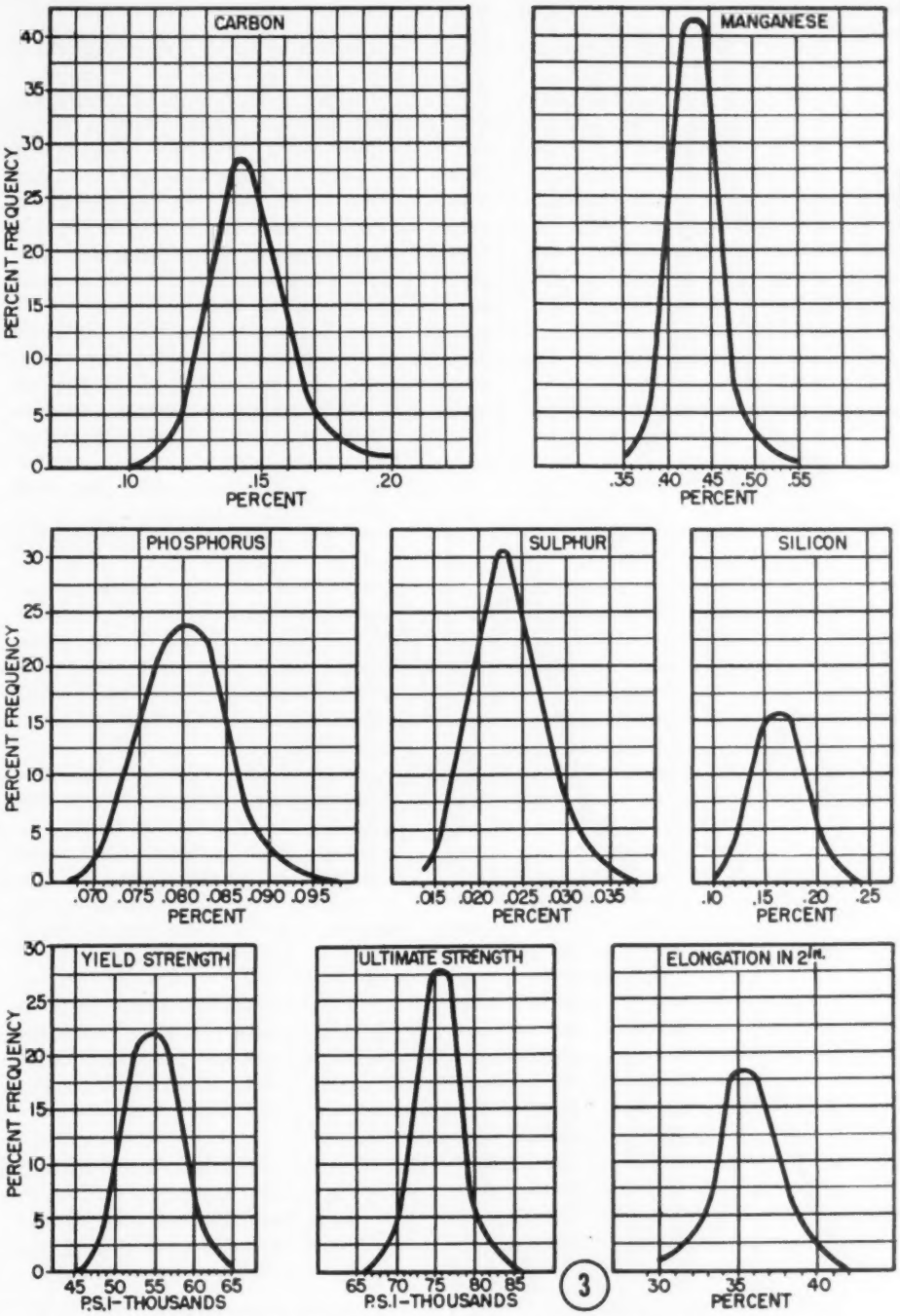


Fig. 3—Frequency distribution of chemical and mechanical properties of low carbon deoxidized acid bessemer steel

Deoxidation of Steel — In production of acid bessemer steel, a typical chemical analysis of metal at the beginning and end of the blow is shown in Table I. If manganese content of the metal at the beginning of the blow is too high, a fluid slag, which contributes to "slopping" is produced. Silicon is a source of heat and therefore an important factor in temperature control during the blow.

Due to speed of reactions and other conditions, the composition of the steel cannot be regulated satisfactorily by stopping the blow at an intermediate point. It is possible to blow a bessemer heat to approximately any carbon content desired, but a more uniform product, in terms of chemical composition, is obtained by blowing to the drop of the flame and adding carbon and manganese as required.

In the bessemer process, character-

istics of the metal at the end of the blow and the deoxidation practice employed are fundamental factors which control quality of the product. Additions required to produce various grades of acid bessemer steel are incorporated in the deoxidation practice and may be made in various ways. Some may be added to the vessel, ladle or mold. In the production of acid bessemer steel for seamless products, all additions are made either to the ladle, or vessel and ladle.

In the deoxidation of bessemer steel, oxygen content of the blown metal as measured by the FeO present is one of the critical factors involved. Iron oxide content is also related to the nitrogen content in that both are increased by higher temperatures and overblowing. In production of killed bessemer steels, deoxidation practice must also take into consideration the fixation of nitrogen. Therefore, for proper deoxidation, it is essential to control carefully the temperature and end point of the bessemer blow.

In Fig. 2, the equilibrium proportions of oxygen is molten steel at 1600°C (2910°F) with various deoxidizers are shown. Influence of temperature in these equilibria is extremely important. Carbon, for example, is a more powerful deoxidizer than silicon or manganese at a temperature of 1600°C (2910°F) when the carbon content of the bath exceeds 0.10 per cent.

In manufacture of acid bessemer welded pipe, rimmed or capped steels are commonly used. These steels are finished with a low carbon content and not completely deoxidized so that a strong evolution of gas occurs during solidification in the mold. Sufficient deoxidizer may be added, either in ladle or mold, to control action in the mold. In capped steels, period of gas evolution in the mold is further controlled by using a steel cap which chills and solidifies top of ingot.

In the manufacture of bessemer seamless pipe, ingots with a dense homogeneous structure free from porosity or blowholes are produced from killed steel. In making killed bessemer steel, strong deoxidizers, including carbon, ferrosilicon and aluminum are added to the molten steel at end of the blow.

Carbon Deoxidation — Deoxidation characteristics of carbon have been discussed with reference to Fig. 2. In the open hearth process, deoxidation of low carbon steel with aluminum in the ladle is based on carbon content of the steel rather than iron oxide content of the slag.

For practical purposes, oxygen content of rimmed or capped acid bessemer steels, which are low in carbon, must to a certain degree be evaluated by behavior of metal in the mold. Increase in carbon content of this type of steel during deoxidation originates from ferromanganese addition.

Carbon content of killed bessemer steel varies from 0.10 to 0.50 per cent depending upon grade of steel. In order to meet carbon requirements and properly deoxidize steel by one method, molten blast furnace iron containing about 4 per cent carbon is added to the vessel immediately at end of the blow. After addition of hot metal, a reaction takes place in the vessel which results in formation of carbon monoxide gas which burns at the mouth of the converter. Removal of oxygen as a gas not only deoxidizes the steel but removes oxygen immediately instead of forming a solid metallic inclusion which must rise to the surface of the steel. Steel made by this process is distinctly different from regular acid bessemer steel. It contains fewer metallic inclusions than if silicon or aluminum had been added to unite with oxygen eliminated with the carbon reaction.

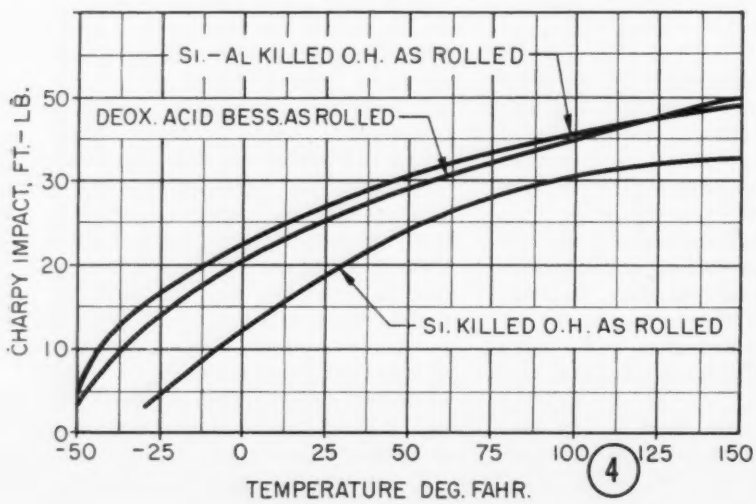
In use of hot metal for deoxidation of acid bessemer steel, provisions must be made for accurate weighing of the addition. Other means may be used for deoxidation by carbon in which solid materials are added but the simplest and most thorough method at present is the use of hot metal.

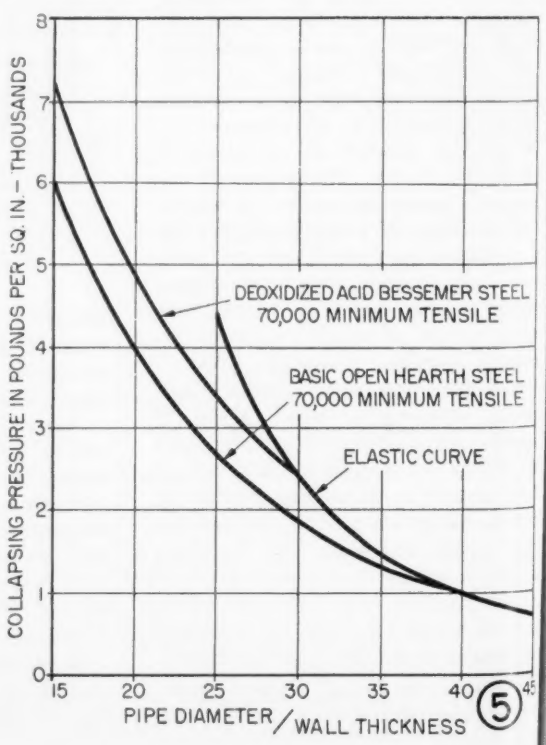
Manganese, Silicon and Aluminum Additions — Manganese and silicon are added either to the vessel after carbon deoxidation or to the ladle. Vessel additions are preferred, and this is accomplished by use of a chute. Usually 80 per cent ferromanganese and 50 per cent ferrosilicon are employed. Special types of deoxidizers containing silicon and/or manganese with aluminum have been used successfully. In manufacture of rimmed or capped bessemer steels, manganese is added to the ladle for fixation of sulphur, and silicon is seldom used.

In Fig. 2, it will be observed that aluminum is a very strong deoxidizer. This element, or its equivalent, is used in the production of killed bessemer steels. Aluminum is added to produce a thoroughly killed steel after carbon and silicon have removed

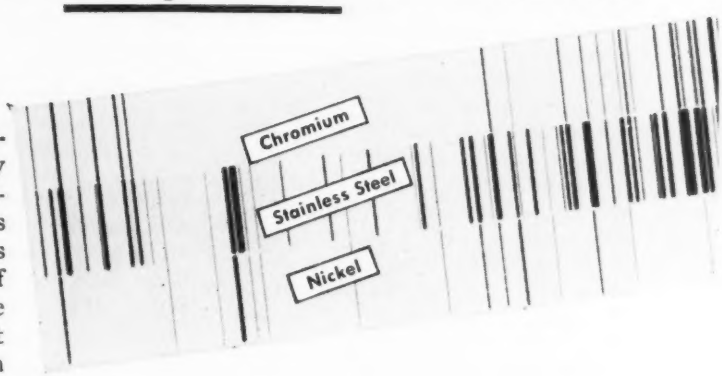
Fig. 4 — Impact properties of bessemer and open hearth steel

Fig. 5 — Resistance of pipe to external pressure

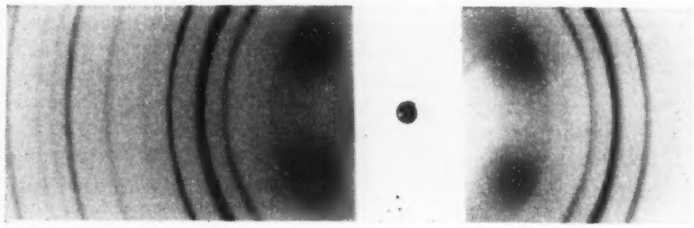




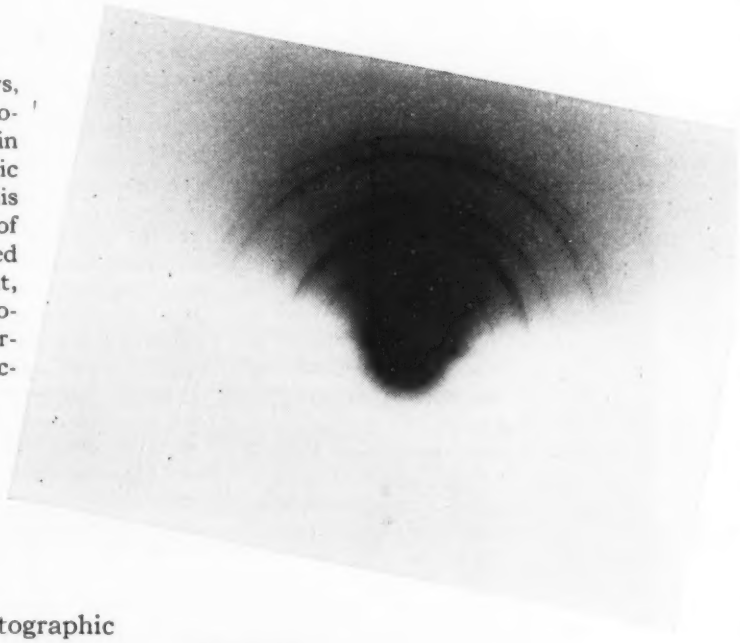
3 ways photography shows composition of materials



Spectrography to study composition qualitatively and quantitatively . . . Using photography to record the light spectra emitted when a specimen is placed in an electric arc or spark, this technic provides an element-by-element analysis of materials, as shown by this spectrogram of a stainless steel specimen. It indicates that the specimen contains chromium, nickel and iron, but none of the other special alloying elements often included in commercial stainless steel to impart certain properties.



X-ray diffraction to study crystalline composition, stresses, thermal history... Using photography to record x-rays that pass through a specimen in certain directions, this technic provides a characteristic pattern of a material. Shown here is the pattern of the stainless steel specimen used above. This pattern shows, by the diffuse spots in the central circle, that the material has different properties in different directions—an undesirable condition for some applications.



Electron diffraction to study thin films, layers, surface reaction products on materials... Using photography to record electrons reflected in certain directions by the surface of a specimen, this technic also provides a characteristic pattern, such as this one of a very thin layer formed on the surface of the same stainless steel specimen, when treated with concentrated nitric acid. This treatment, known as passivation, and used to enhance corrosion resistance in stainless steel, is still little understood. Much of the answer will come from electron diffraction studies such as this.

Testing of materials by the above photographic technics can be accomplished in your own research department, or by arrangement with a number of outside organizations that specialize in such work. Why not look into the usefulness of these testing procedures for plant control purposes in your own organization? Kodak will be glad to supply you with more specific information.

Eastman Kodak Company, Rochester 4, N. Y.

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TABLE I

TYPICAL ANALYSIS OF ACID BESSEMER IRON AND BLOWN METAL

	C	Mn	P	S	Si
Iron	4.25	.55	.075	.020	1.50
Blown Metal	.04	.01	.081	.023	.005

most of the oxygen. Aluminum additions are made to the ladle, and a sufficient quantity in the form of notched bars is added to insure fine grained deoxidation practice. Various methods have been used for adding aluminum to steel. At present, experimental work is being conducted in an effort to develop a superior method for making this addition. In the production of rimmed or capped bessemer steels, very little aluminum is used and it is normally added to the mold.

Although aluminum is primarily added to steel for purposes of deoxidation in the production of killed bessemer steels, it is also used for nitrogen fixation. Considerable experimental work is being conducted along these lines which includes the use of the other deoxidizers such as titanium, zirconium and boron. Fixation of nitrogen in killed bessemer steel with aluminum or other elements imparts to this steel superior toughness characteristics.

Bessemer Steel for Welded Pipe—In 1887, Thomas J. Bray, Riverside Iron Works, Wheeling, W. Va., began making butt and lap welded pipe of soft bessemer steel. Up to that time, wrought iron was the only material used for welded pipe and tubes. Use of bessemer steel for this application by Riverside proved that steel was equal to wrought iron and actually superior in many respects. Today, bessemer steel is used extensively to produce welded pipe by the continuous and noncontinuous welding processes. In 1946, approximately 1,500,000 tons of butt welded pipe were produced in the United States, and practically all of this pipe was made from acid bessemer steel.

Chemical and Mechanical Properties — Welded pipe made from bessemer steel has a chemical composition approximating 0.06 to 0.09 per cent carbon, 0.30 to 0.60 per cent manganese, 0.075 to 0.095 per cent phosphorus and 0.030 to 0.045 per cent sulphur. In some specifications to which this product is applied, phosphorus content of 0.110 per cent maximum and sulphur content of 0.065 per cent maximum is specified. Mechanical properties of this material will conform to 30,000 pounds per square inch minimum yield strength, 50,000 pounds per square inch minimum tensile strength and 18 per cent minimum elongation in 8 inches. Also, welded tubular products made from bessemer steel have to withstand bending, flattening and hydrostatic testing requirements, depending on the end use of the product.

TABLE II

CHEMICAL BALANCE OF A KILLED BESSEMER HEAT

	Blown Metal 120,000 lb		Molten Iron 3360 lb		Ferromanganese 720 lb		Ferrosilicon 600 lb		Al. 180 lb		Final Heat Addition 124860 lb*		Efficiency
	%	Wt	%	Wt	%	Wt	%	Wt	%	Wt	%	Wt	%
Carbon	0.04	48	4.25	143	7.00	50					0.15	187	75
Silicon	0.008	10	1.50	50			48.00	288			0.21	262	75
Manganese	0.05	60	0.60	20	78.00	562					0.436	544	83
Aluminum	0.003	4	0.008						95	171	0.04	50	30
Oxygen	0.08	96									.015	19	

* It is estimated that 47 lbs. of carbon in the hot metal reacted with 63 lbs. of oxygen in the blown metal to produce 110 lbs. of CO and steel with 0.12% carbon. Metallic losses to slag and CO are not included in the chemical balance.

Product Applications—Welded pipe is usually made into two separate classes; namely, standard, and extra strong. Each class is distinguished by a difference in wall thickness. Standard pipe is intended for ordinary uses in steam, water, gas and air lines where operating pressures are low. Extra-strong pipe with heavier wall thickness than standard pipe is used where higher internal pressures or greater column loads are to be sustained. Where corrosion is a problem, the pipe is usually galvanized.

Bessemer Steel for Seamless Pipe—Many factors involved in the production of acid bessemer steel have already been discussed. However, in the production of bessemer seamless pipe a thoroughly deoxidized steel is employed and, therefore, a brief summary of the deoxidation practice employed is in order. It is this feature of the process which is responsible for the fact deoxidized or killed bessemer steel for seamless pipe is a distinctly different product from regular acid bessemer steel and is equivalent to open hearth steel. Production of seamless pipe is a difficult forging operation. A billet of uniform density and forging characteristics is required. Satisfactory seamless tubes have rarely been produced with uniform practice from either bessemer or open hearth rimmed or tapped steels. Differences in manufacturing practice are summarized in Fig. 1. Commercial production of bessemer seamless pipe by National Tube Co. was initiated in the latter part of 1937. Since the introduction of bessemer seamless, we have produced over 800,000 tons of seamless pipe from this type of steel.

Factors responsible for superior quality of deoxidized bessemer steel do not originate entirely from the fact that a killed steel is involved, but, more precisely, in method of killing the steel. The partial chemical balance with reference to deoxidation in a killed bessemer heat is summarized in Table II. Two 30-ton bessemer blows containing 0.04 per cent carbon are treated with 1680 pounds of hot metal added to each converter after blowing. Mixing of blown metal and hot metal is almost instantaneous and elimination from the metal of carbon and oxygen as CO gas is rapid.

After carbon reaction, steel is treated in the vessel or ladle with ferromanganese and ferrosilicon. Efficiency of these additions is similar to that obtained in open hearth practice at the same carbon level. Sufficient ferromanganese is added to provide the final manganese content desired. For killed steel containing about 0.15 per cent carbon, three pounds of aluminum per ton of steel are added to the ladle, and for steel containing about 0.35 per cent carbon, two pounds of aluminum per ton of steel are used.

When steel is ready for teeming, the practice from this point to the finished product is similar to that employed for the manufacture of open hearth seamless pipe. Bessemer seamless pipe 2 to 14 inches in diameter is pierced in the regular manner by the Mannesmann process, double piercing being used for the larger sizes. Seamless pipe less than 2 inches in diameter is produced by cold drawing hot rolled pipe. Sizes 16 to 26 inches in diameter and in lengths exceeding 40 feet are produced by double piercing and the rotary rolling process.

Properties of Bessemer Steel — In the production of over 800,000 tons of deoxidized acid bessemer seamless pipe, it was soon determined that the properties were fundamentally different from those of regular acid bessemer welded pipe. Data concerning most of the important properties of this new material have been obtained and these properties are equivalent or superior to those of open hearth pipe.

Typical chemical and mechanical properties of deoxidized acid bessemer Grade-B seamless pipe are summarized in Fig. 3. These data are based on 2,200 regular 60-ton produc-

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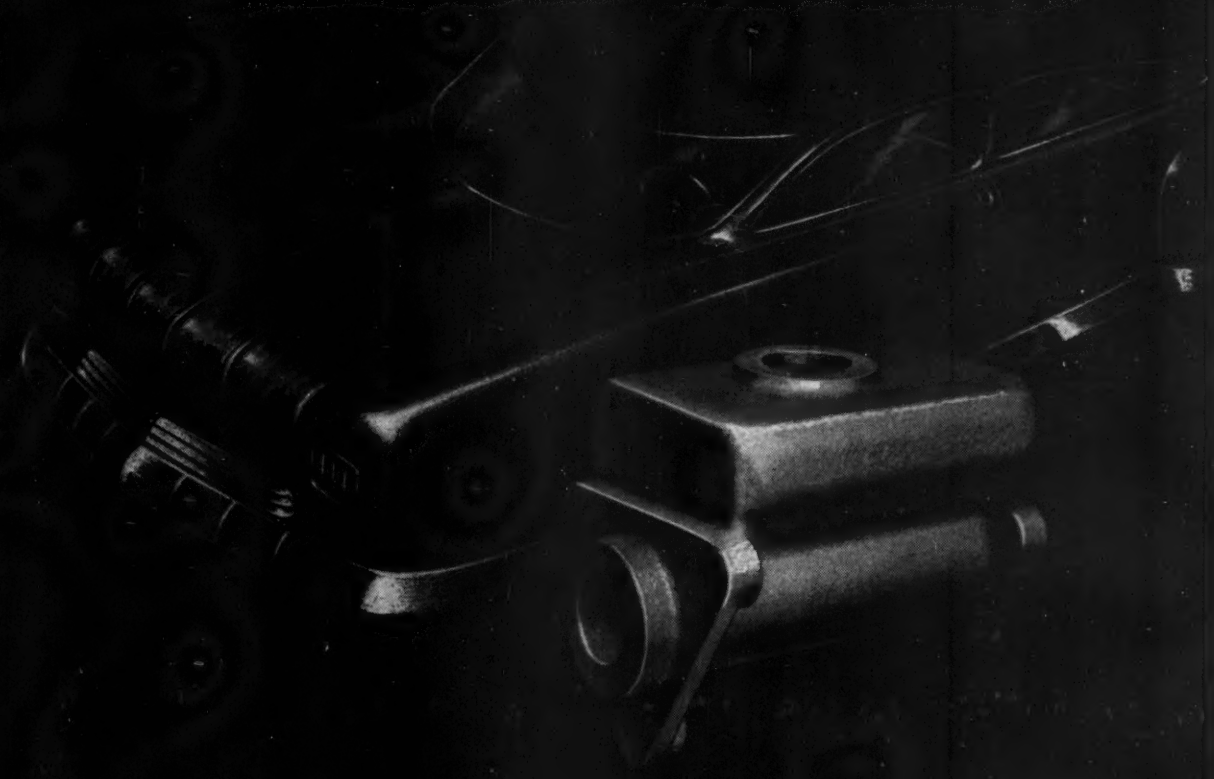

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tion heats produced in 1946. The average chemical and mechanical properties of high carbon grade J-55 bessemer seamless from 1400 tests obtained in one of National Tube Co.'s mills during 1946 were carbon 0.37 per cent, manganese 0.96 per cent, phosphorus 0.085 per cent, sulphur 0.24 per cent, silicon 0.19 per cent, yield strength 67,494 pounds per square inch, ultimate strength 108,125 pounds per square inch and 28.4 per cent elongation in 2 inches.

Collapse resistance of casing is a fundamental property which is of great importance in obtaining resistance to external pressure in oil wells. Collapse tests made on many sizes of API grades H-40 and J-55 casing show that bessemer seamless casing is superior to open hearth seamless. A comparison of the resistance to external pressure of bessemer and open hearth grade H-40 seamless pipe is shown in Fig. 5. The relationship of collapse pressure is depicted, i.e., the external pressure at which the pipe fails in collapse to various sizes of casing, i.e., outside diameter of pipe (d) /thickness (t) ratio.

Toughness of steel is usually evaluated by the Charpy impact test. Impact properties at various temperatures of bessemer seamless are comparable with open hearth steel used for seamless pipe. Typical impact properties of as-rolled material are shown in Fig. 4 for medium carbon grade G steel made to ASTM specifications A-53.

Susceptibility of grade B bessemer seamless to embrittlement by cold work is similar to that of various types of open hearth steel used for seamless pipe. Embrittlement characteristics are usually determined by Charpy keyhole notched impact tests of cold worked and aged seamless pipe.

Considerable quantities of grade B bessemer seamless pipe used in place of open hearth seamless have exhibited satisfactory welding and other fabricating characteristics. Many high pressure gas lines of bessemer seamless have been satisfactorily welded and the material has also been hot swaged, hot bent, Van Stoned and threaded in a manner similar to open hearth steel. For a similar carbon and manganese content, yield strength of as-rolled bessemer seamless is usually 10,000 to 15,000 pounds per square inch higher than open hearth seamless. It is thus possible to produce a higher strength pipe from killed bessemer steel and retain chemical composition in a range which is readily weldable.

Properties of bessemer seamless steel at elevated temperatures have been investigated at the United States Steel Corp. Research Laboratories by means of short-time tensile and long-time creep tests at elevated temperatures. In general, properties of bessemer seamless are similar to those of open hearth seamless, and results of elevated temperature studies indicate the working stresses for bessemer seamless may be similar to open hearth steel made to fine grain aluminum deoxidation practice. The stability at elevated temperatures of over 100 different steels for a period of exposure of 10 years is under investigation. In this investigation, it has already been determined for exposure periods of 10,000 hours at temperatures of 900 to 1200°F that bessemer seamless is similar to open hearth seamless with respect to graphitization characteristics.

Recently, a modern creep testing laboratory has been installed by National Tube Co. and high temperature properties of bessemer seamless and many other types of steel will be evaluated more thoroughly, particularly after long periods of exposure at elevated temperatures.

Not Recommended for High Temperatures and Pressures — Bessemer seamless pipe is incorporated in many specifications, including the basic ASTM specification A-53 and A-120 for pipe and the API specifications 5A, 5L and 5LX for oil country tubular goods. It has been approved by the ASME Boiler Code Committee, Pipe Fabricators Institute, ASA Code for Pressure Piping and other recognized bodies.

The material is used in most applications which involve the use of ordinary open hearth seamless pipe. It is not intended for use at extremely high temperatures and pressures which normally require a special alloy pipe. It is also not intended for use at very low temperatures as alloy steels with special deoxidation practices and in the heat treated condition are usually used.

Bessemer seamless is used in all large tonnage applications of seamless pipe which require material with a minimum yield strength of 35,000 to 55,000 pounds per square inch and a corresponding minimum tensile strength of 60,000 to 95,000 pounds per square inch. Tubing requirements, including boiler tubes, utilize a lower yield strength material, and bessemer seamless has not been developed for these applications due to its inherent high strength. Gas transmission lines, oil well casing, chemical plant and oil refinery piping, steam, air and water piping, piling and structural pipe indicate some of the principal applications of this new material.

—o—

Society of Automotive Engineers Inc., New York, is making available 10 new and two revised aeronautical material specifications. The complete set, offered for $.90, includes specifications for shot peening, aluminum alloy wire, low carbon steel, steel castings, alloy castings, steel wire, corrosion and heat resistant steel, gaskets and bolts and screws.

MADE-TO-ORDER STEEL LIFTER: Common use of 5-ton unit loads of steel brought about development of this mobile crane by Silent Hoist & Crane Co., Brooklyn, N. Y. Designed specifically for loading and unloading box cars, gondolas and flat cars with five-ton unit lifts, the crane is able to reach a load on the far side of the car, lift it clear and transport is through congested areas either forward or in reverse at speeds up to 10 miles per hour

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Huge Conveyor Boom

Brings "New Look" to Lake Vessel

FASTER unloading and service to hitherto inaccessable ports along the Great Lakes are possible for Columbia Transportation Co.'s *Crispin Oglebay* since it has been refitted and equipped with a fast self-unloading system incorporating what is said to be the world's largest shipboard boom conveyor.

The 40-year-old coal and limestone freighter, previously known as the *S. B. Way,* was given a new lease on life by American Shipbuilding Co. which installed the electric unloading equipment, replaced the boilers, overhauled the main engine and mounted a new propeller and rudder. Speed of the ship, which now is in service, has been increased by about one mile per hour.

The all-electric conveying system, powered by approximately 750 horsepower in General Electric induction motors, has a normal unloading speed of 2200 long tons an hour. This compares with a usual speed of 1800 long tons for ships of *Oglebay's* type. Widening of the hold conveyor belts from the 42 inches commonly used to 48 inches and of the boom belt from the usual 48 inches to 60 inches made possible this higher unloading rate.

The 240-foot-long conveyor boom, which can swing an arc of 113 degrees on either side of the ship's centerline and can be inclined up to 30 degrees from the horizontal, is of all-welded, alloy steel construction which reduces its weight by about 10 per cent. The "A" frame for hoisting and supporting the boom rises 52 feet above it near the bow and goes all the way to the bottom of the ship where the "A" frame is rigidly fastened to the hull.

One of the most unique installations aboard the vessel is a GE 300-ampere motor-driven welder, mounted permanently in the engine room. Leads from the welder run to all machinery spaces and to the deck so that virtually any portion of the ship may be welded with a minimum of difficulty.

Coal and Coke Test Specifications Published

In the 163 pages of the recently published American Society for Testing Materials standards on coal and coke are some 29 different standard specifications and tests for those materials. The standards, given as of September, 1948, include a number of changes made during the current year as well as certain new material. Typical of the test methods and procedures pertaining to coal are sampling, analysis for volatile matter in connection with smoke ordinances, drop shatter test, sieve analysis and cubic foot weight.

For coke there are standardized methods for sampling and tests for volume of cell space, drop shatter, tumbler, sieve analysis and cubic foot weight. An appendix gives several proposed methods which the ASTM committee D-5 is studying involving: Test for expansion pressure of coal during coking; test for carbonization pressure of bituminous coal, etc. The booklet is available from the society's Philadelphia headquarters for $2.00.

Holes Drilled from Under Increase Production

Production is increased and chips easily cleared on a special purpose machine which is designed to drill holes from underneath. The machine is composed of a standard gearless drill head, like the machine built by Zagar Tool Inc., Cleveland, on each side of which are located two hydraulic cylinders which act as the feed mechanism for the head. There is a fast approach to the drilling position, a feed rate during drilling and a fast return to the original position.

Drills receive their rotation direct from a direct drive electric motor. The work holding fixture is composed of an indexing mechanism, wherein the parts are loaded on the top and indexed under a hard steel plate. Loading is while the drilling operation is taking place. Self-contained machine has a built-in lubricating system. Cycling is controlled with electrical limit switches and solenoid operated hydraulic valves.

Nuclear Charts Available For Classroom Use

Important areas of nuclear physics are illustrated in two colors in the six lithographed wall charts prepared by Westinghouse Electric Corp.'s School Service for use in the classroom. The charts, measuring 25 x 36 inches, are accompanied by a 32-page book of valuable supplementary information. Book and charts together are being made available for $1.00.

Boon to Product Designers

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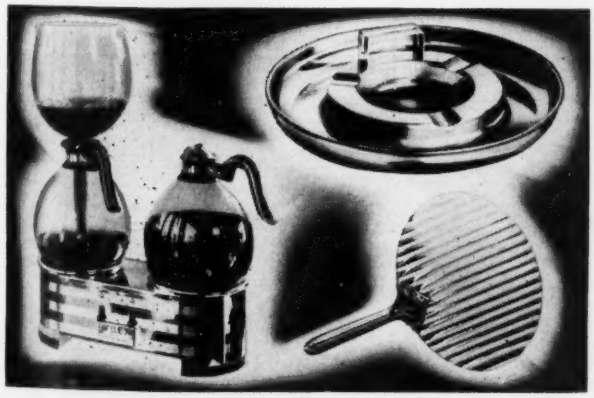

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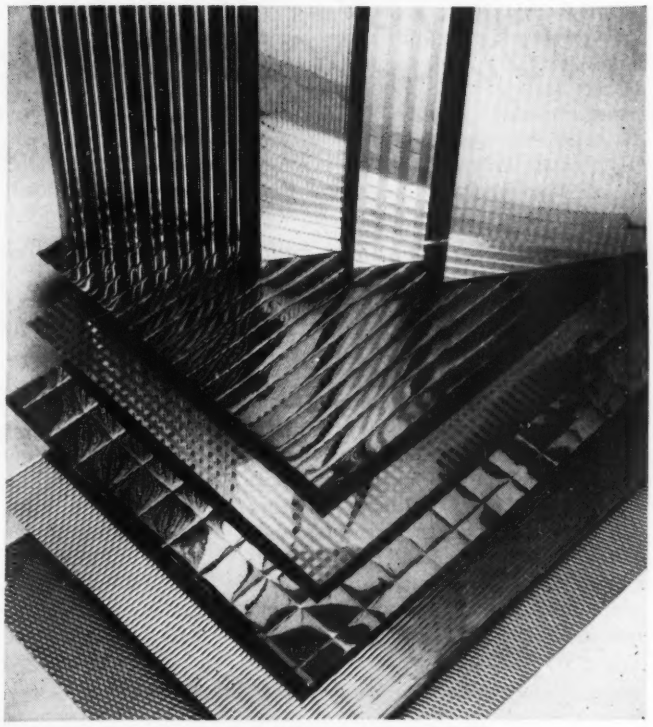

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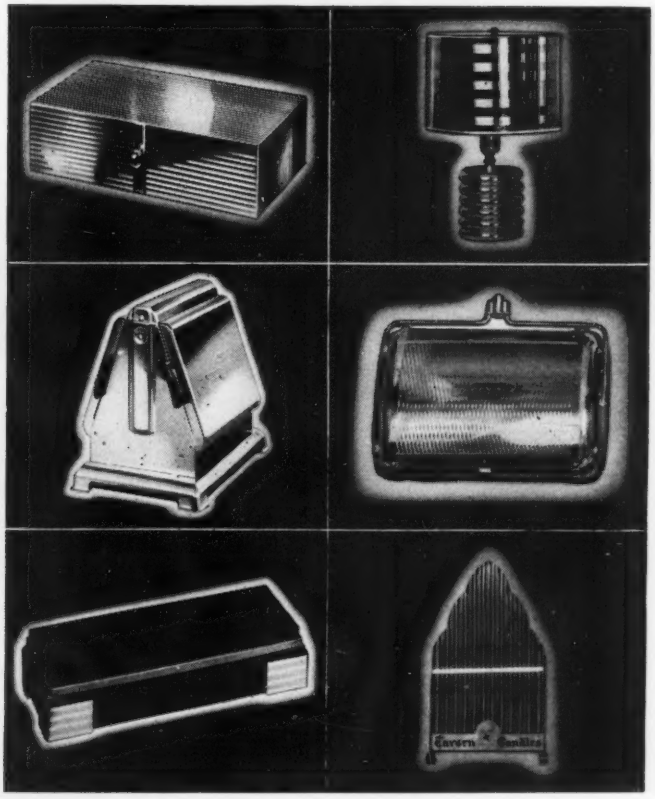


HEAVY DUTY *Air Cooled Engines*

. . . developed by Continental Motors

Designed for front-line military vehicles, units develop maximum power with minimum weight and space requirements. Production and field maintenance problems simplified

SERIES of heavy-duty air-cooled engines for front-line military vehicles, ranging from 125 to 1040 horsepower, has been developed for the Ordnance Department by Continental Motors Corp., Detroit. Operating on standard 80-octane gasoline, they are designed to develop maximum power with minimum weight and space requirements. The 250-horsepower model, for example, weighs only 777 pounds, as compared with 2400 pounds for a liquid-cooled engine of similar power, and requires little more space than the liquid-cooled type demands for radiator and fan alone. This means important possibilities for the military in terms of added load carrying capacity and fuel storage for combat vehicles, as well as savings in construction materials.

The series of six engines uses only two basic cylinders, of 4⅝ and 5¾ inches diameter, in each of which all parts are interchangeable. Differences in power are obtained by increasing the number of cylinders and by stepping up the compression ratio in the basic cylinder models. Units with the smaller cylinder are built as 4, 6 and 8-cylinder horizontally-opposed models from 125 to 250 horsepower; and with the larger cylinder as a 6-cylinder horizontally opposed and as 8 and 12-cylinder 90-degree V-types, ranging from 375 to 1040 horsepower, with or without supercharger.

Cylinder barrels are forged of SAE 4140 steel and around them are cast aluminum alloy muffs, bonded to the steel by the Al-Fin process. Deep, thin fins are machined into the muffs. Heads are cast aluminum, suitably finned and screwed and shrunk to the barrels. Exploded view of a typical cylinder assembly with overhead valves is shown in Fig. 1.

Further advantage of a standard

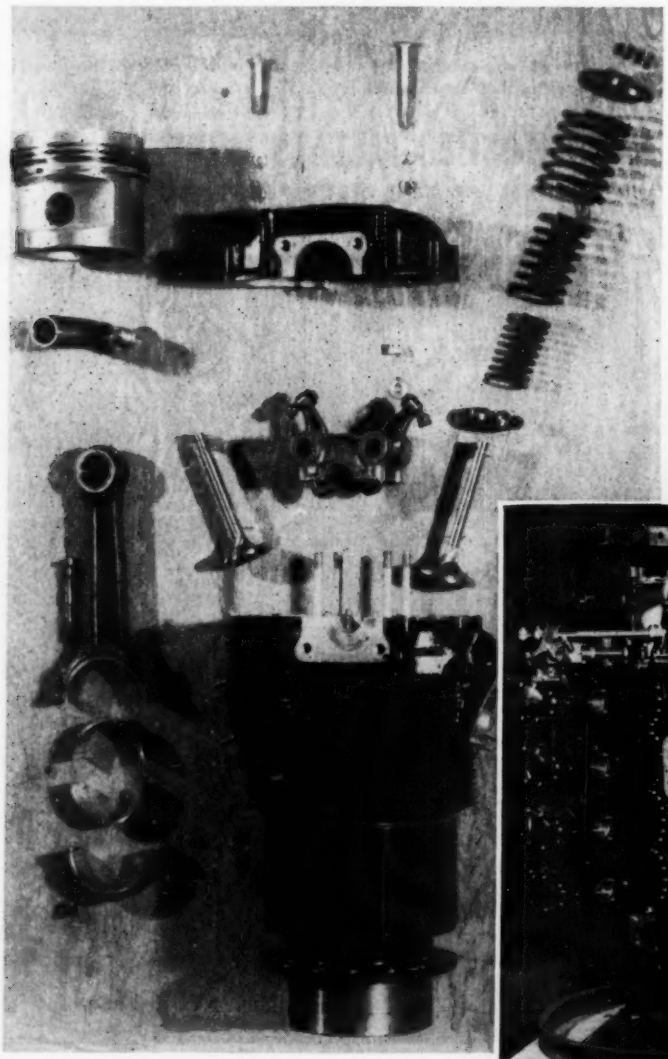
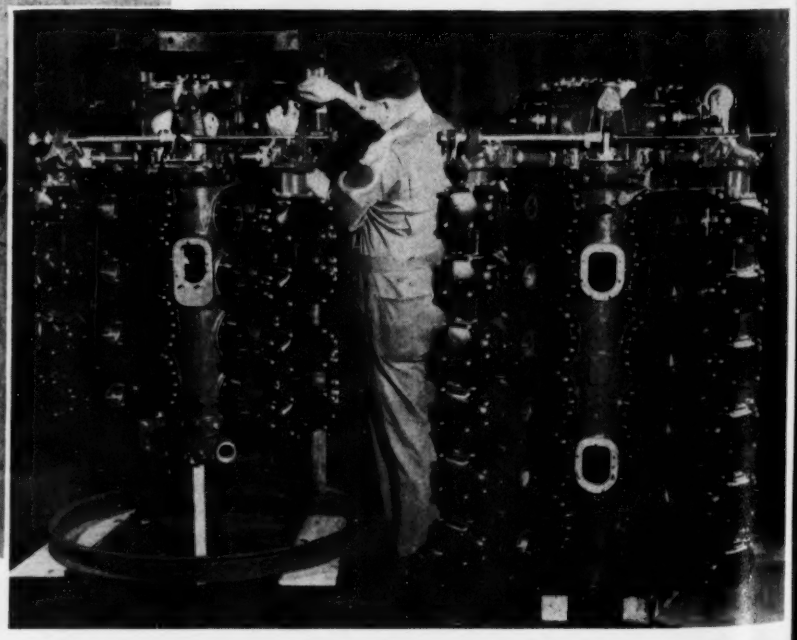


Fig. 1 (left)—Exploded view of a cylinder assembly which is a basic unit of the new line of heavy-duty air-cooled engines. Two different cylinders, one 4⅝ and the other 5¾ inches diameter, are combined in 4, 6 and 8-cylinder horizontally-opposed and 8 and 12-cylinder V-type engines having a power range from 125 to 1040 horsepower. Interchangeable parts in each cylinder facilitate quick mass production in an emergency, and lessen problems of maintenance and repair in the field

Fig. 2 (below)—Eight and 12-cylinder V-type heavy-duty air-cooled engines are shown here in a partly assembled condition. The 8-cylinder unit develops 530 horsepower and the 12-cylinder model 810 horsepower without supercharger. Supercharged, they are rated at 685 and 1040 horsepower respectively



line of engines to the army lies in simplification of production and field maintenance problems. In the past war six different engines were used in medium tanks alone, and, as pointed out by Col. Joseph M. Colby, chief of research and development for the Ordnance Department's Detroit Arsenal, this required six different sets of tools, six sets of maintenance literature, six differently trained groups of mechanics and 5165 different spare parts, thousands of each being needed in stock at every front-line supply depot. With one standard engine, the number of spare parts can be reduced to 954 and the same mechanic will be able to maintain and repair both small and large engines.

The engines average about 4 pounds per horsepower, of which roughly 60 per cent is steel. They develop 128 pounds brake mean effective pressure and are estimated to involve manufacturing cost per horsepower approximately equivalent to liquid-cooled engines. Cost per pound naturally is three to four times that of the liquid-cooled units. They operate equally well in frigid or tropical climates, another signficant military advantage. Cooling is based on ambient air temperature of 120° and cylinders may develop temperatures as high as 500° , providing a wide differential in temperature for their cooling which is done through a large fan mounted on the engine.

The Detroit Arsenal already has made several installations of the new engines in special vehicles. A 70-ton tank, for example, is powered by the supercharged V-12 connected to torque-converter transmission, permitting speeds up to about 25 miles per hour and finger-tip control of reversing and turning. A 16,000-pound T-51 six-wheel cross-country carrier has the 8-cylinder 250-horsepower flat-type engine, mounted vertically at the front, thereby releasing valuable additional carrying capacity.

While the engines as presently evolved are strictly Ordnance types, with numerous special accessories and treatments to render them proof against weather and terrain, the com-

Flash Welding... speeds output of endless steel bands

INSTALLATION of three 20-kilovolt ampere flash welders, manufactured by Progressive Welder Co., Detroit, has more than doubled productivity per machine-hour at a plant of a leading producer of endless steel bands for use as wheel rims of tricycles, bicycles, scooters, etc.

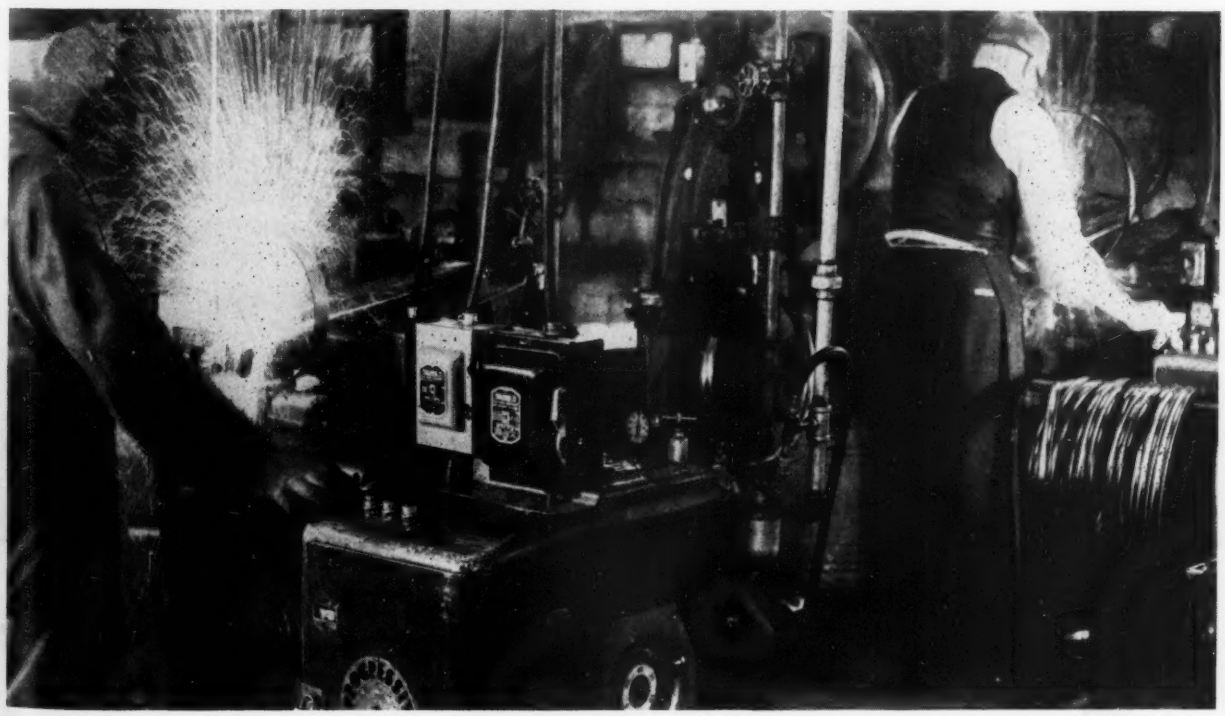
The new motor-operated, automatic flash welders replace manually operated machines, and have rated production capacity of 500 flash welded bands per hour, with production of 800 units per hour possible.

One of the features of the welders is a double cam, through use of which the entire welding cycle takes place in a 180-degree rotation of the cam. This feature makes possible shorter machine time when welding comparatively light stock.

To provide for welding of heavier stock, Cone-drive speed reducers are used to drive the machine cam with its two upset blocks. This type of gearing has a large reserve of excess load capacity for handling higher upset loads. A range of speed adjustments is also provided to take care of different sizes of stock which may be used.

Use of these machines has resulted in marked improvement in weld quality consistency, since every operation, including clamping, current flow, flash, upset, and reset for the next weld, is controlled by the automatic welding cycle.

Illustrated are two of the welders in operation. The one in the foreground is welding endless steel bands from flat stock, while preformed stock is being used on the other unit.



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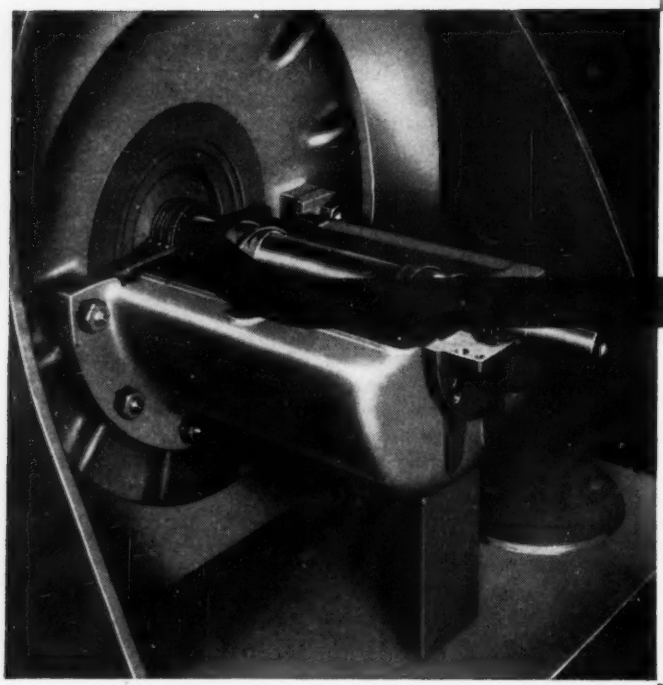
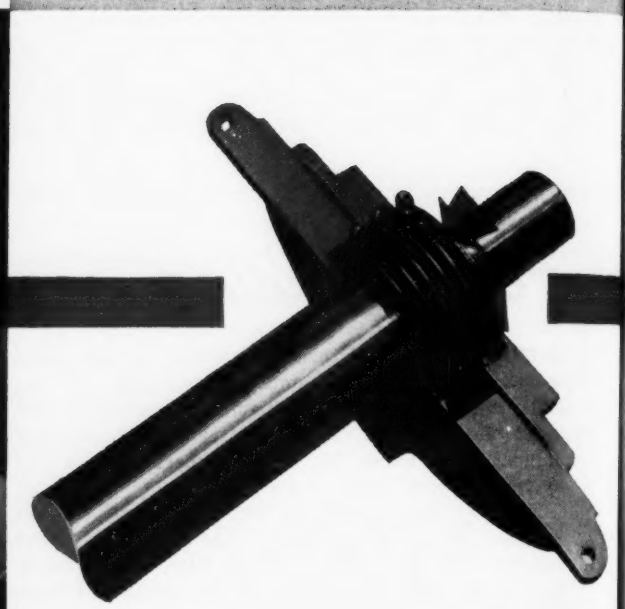
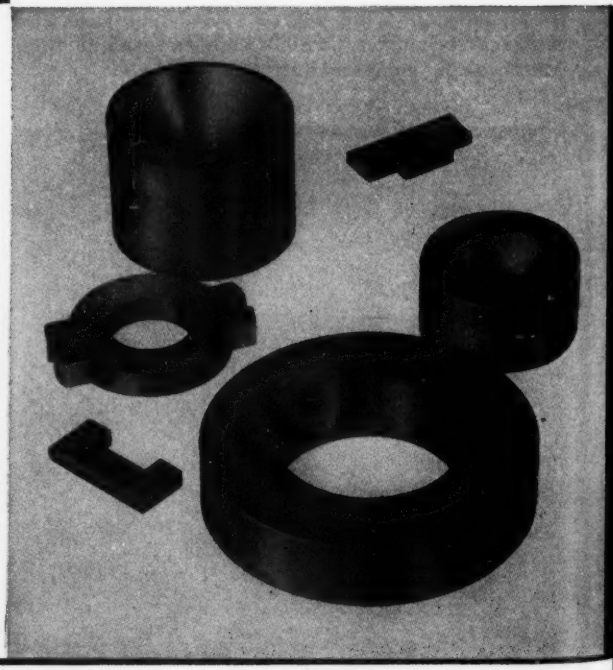




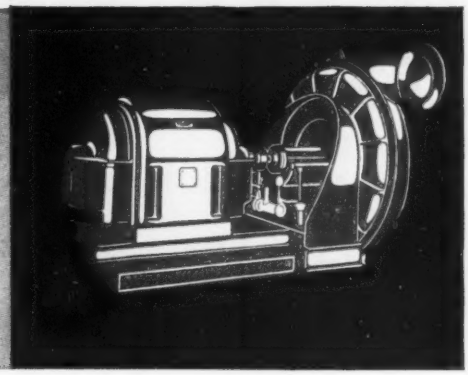


Graphitar seals, rings, vanes, liners, and other parts are molded of carbon and graphite and may be finished to close tolerances, .0005" in small sizes. They are mechanically strong, self-lubricating, and chemically inert. They are virtually unaffected by temperature extremes. They are extremely light weight. These advantages are increasing the efficient performance of a wide variety of pumps, turbines, compressors, blowers, rotary pressure joints, and other mechanisms. Perhaps we can show you how Graphitar parts will improve the operation of your products at lower cost. For specific recommendations, send us prints. Ask for your copy of the 44-page Graphitar catalog.

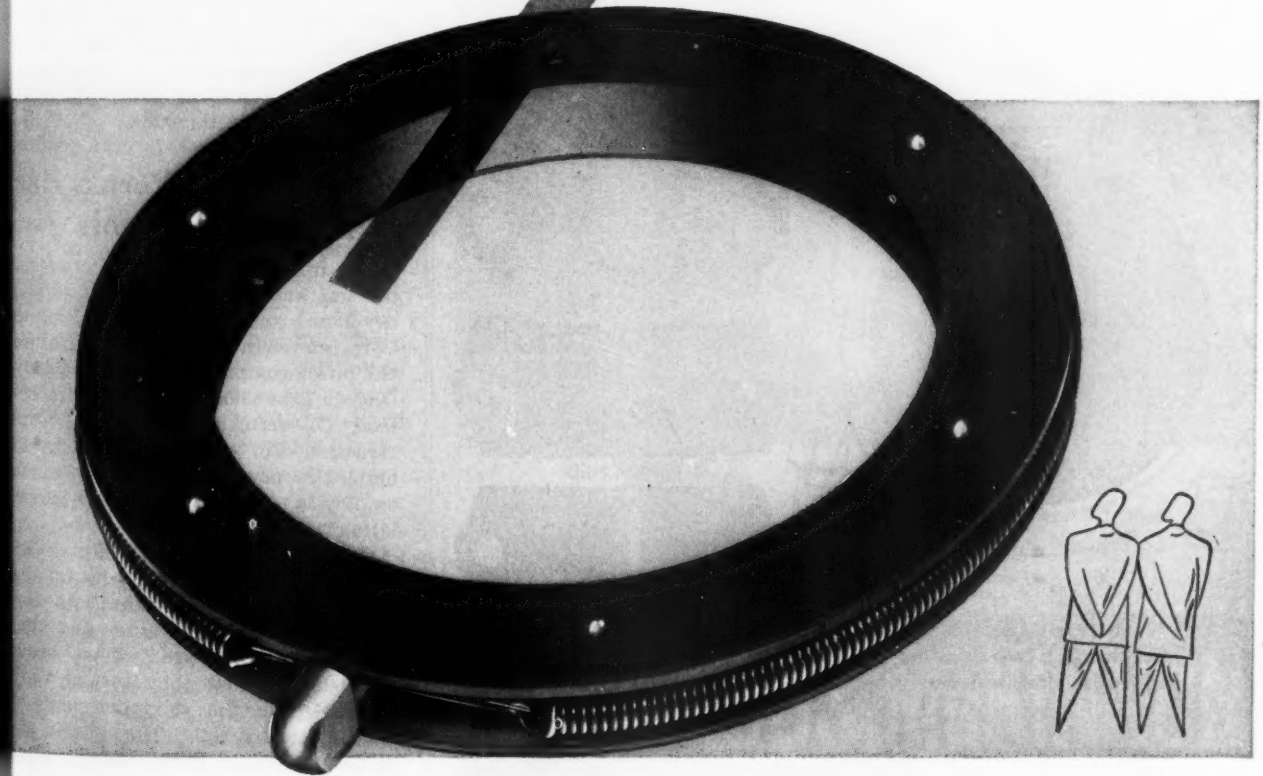
THE UNITED STATES GRAPHITE CO

eal in blower packing box

nploys 3 GRAPHITAR RINGS
toxic gas



Hot air or toxic gas escaping from the packing box of an industrial blower can create dangerous working conditions as well as lessen blower efficiency. That can't happen in the Type P Centrifugal Blower made by the Elliott Co., Jeannette, Pa., because Elliott engineers specify Graphitar rings for installations where the seal problem is critical. These segmented Graphitar rings are held together with a garter spring and are fitted with thrust buttons that assure a close fit against the face of the packing box. A stop lug affixed to the spring prevents rotation of the ring with the shaft. Strong, tough, self-lubricating, the Graphitar rings provide a leak-proof seal even at high rubbing speeds and temperatures up to 800° F. They will not score, warp, burn, or distort. Such dependable Graphitar performance is one of the reasons why Elliott Blowers are used so extensively in the chemical and process industries.



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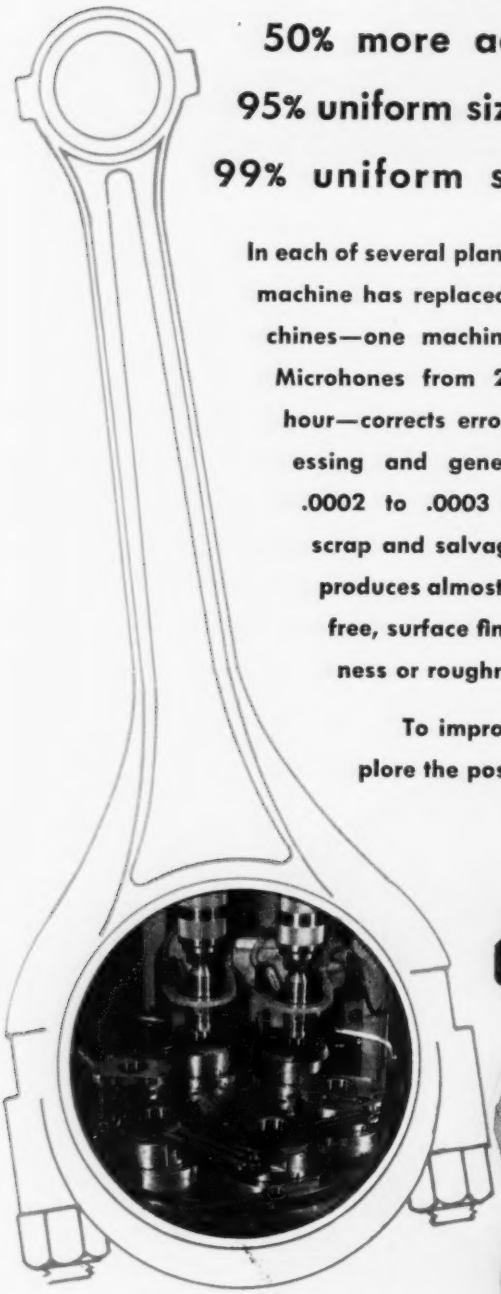
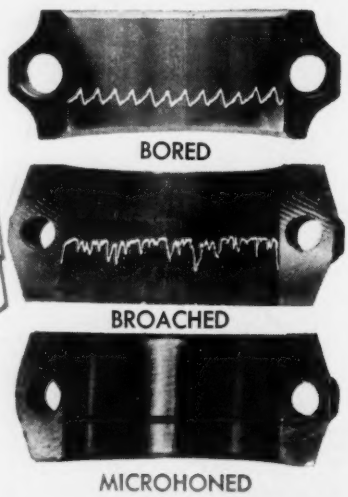


In each of several plants, one microhoning machine has replaced three grinding machines—one machine and one operator Microhones from 250 to 400 rods per hour—corrects errors from previous processing and generates accuracy within .0002 to .0003 inch—reduces oversize scrap and salvage re-runs to within 5%—produces almost perfectly uniform, chatter-free, surface finish of any desired smoothness or roughness.

To improve your production, let's explore the possibilities now.

Six-station fixture for Microhoning two connecting rods simultaneously.



Comparison of Profilograph records of typical connecting rod machining operations.

* TRADEMARK REG. U. S. PAT. OFF.

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Micromold Manufacturing Div., Boston Post Road, Guilford, Conn.

mercial implications of the development are obvious. At a later date, Continental Motors may explore this phase. At the moment, the power plants can be considered still in the developmental stage, since no production program has been released by Ordnance.

Dow Announces Brazing Methods for Magnesium

Three commonly used brazing methods—furnace, flux dip and torch—are now applicable to magnesium with a process that was recently announced by Dow Chemical Co., Midland, Mich.

For furnace brazing, the parts to be joined are assembled with preplaced brazing alloys, fluxed and heated to the proper temperature in a furnace. In flux dip brazing, the assembled parts are dipped in a molten flux bath. Torch brazing is similar to gas welding except that little or no melting of the base metal occurs. It is accomplished by using standard gas welding equipment employing a neutral oxyacetylene or natural gas-air flame.

The brazing process requires careful design of joints with proper clearance and proper placement of filler metal. Temperatures in the process are between 1075 degrees F and 1160 degrees F. As yet only brazing of Dowmetal M magnesium alloy is practical on a commercial basis but brazing of other alloys is in the experimental stage.

New Cracking Process Has "Packaged" Elements

An improved catalytic cracking process, known as the Houdriflow and developed jointly by Houdry Process Corp. and Sun Oil Co., is to feature the latter company's plans for a $16,000,000 expansion program at its Toledo, O., refinery. Catalytic Construction Co. of Philadelphia is to build the new refinery units which employ a pneumatic lift for circulating the catalyst.

One of the unusual features reported about the new design is the fact that all of the catalytic elements, such as the reactor and kiln, are of the "packaged" type, being of such size that they can be fully assembled in the shop and shipped to the site by rail. The unit is designed to charge 42,000 barrels of oil per day to the reactors. Also to be built at the Toledo refinery are a gas recovery and gasoline stabilization plant, a polymerization plant, a crude distillation unit, a vacuum flash unit as well as other necessary auxiliary equipment.

Carbide-Tipped Hobs

(*Continued from Page* 96)

jobs be returned to the grinding department in such condition that only a finishing wheel is necessary to resharpen properly and efficiently.

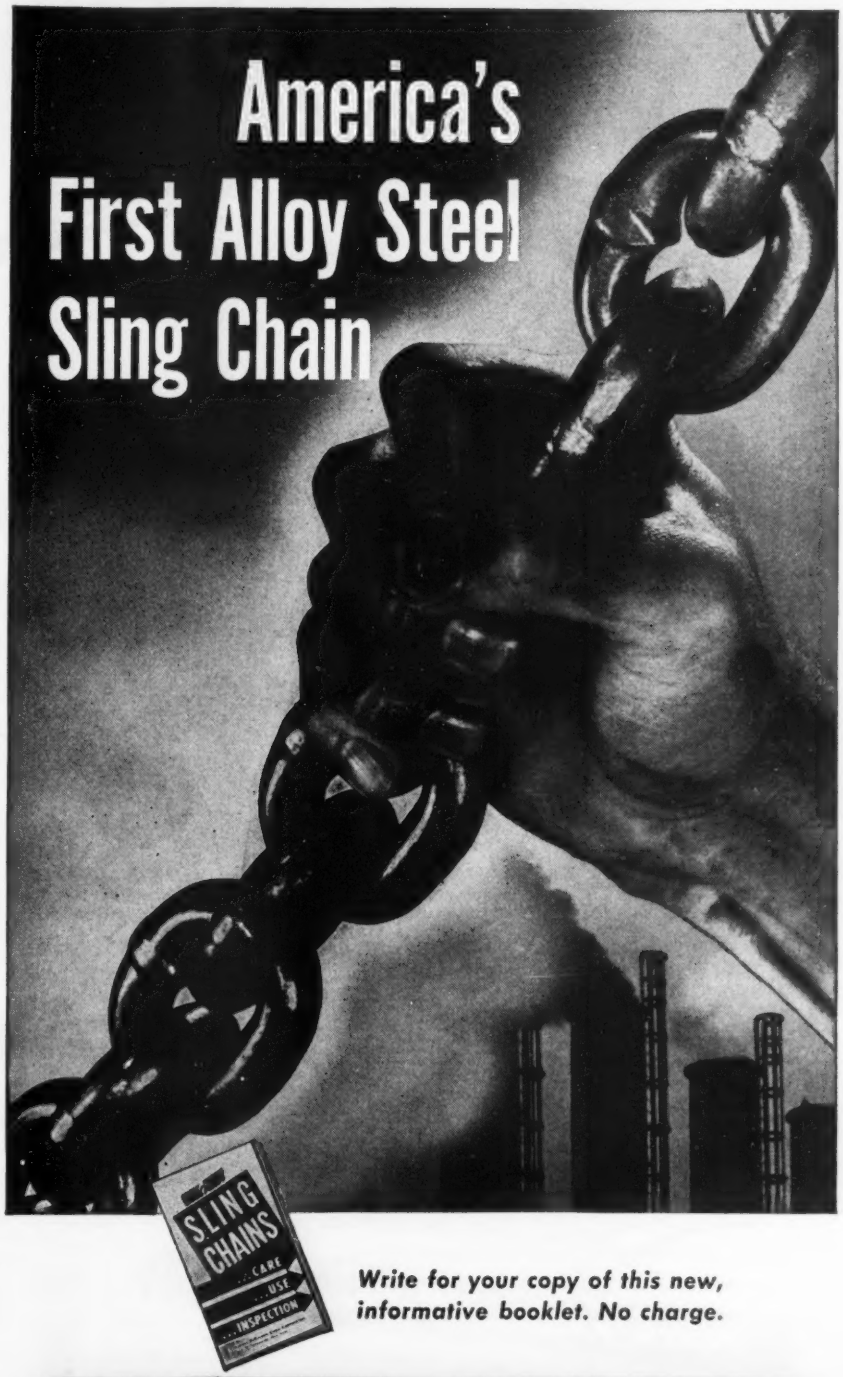
A diamond wheel should always be used to sharpen carbide-tipped hobs and cutters. Resinoid bonded wheels have been found best for general purpose sharpening. In selecting proper diamond wheel, as well as correct feed and speed, determining factor is finish required. General practice is to select wheels 120 to 220 grit for roughing and finishing. For superfine finish, up to 400 grit can be used. In all cases, wheels should have 100 concentration of diamonds. Finish of at least 10-20 microinches can be obtained with a wheel not furnished now, of the specifications D 180-J-100-1/16. Fine finish on the surfaces of the hob teeth means more pieces per sharpening, as well as a better finish on the work.

A 7-inch diameter diamond wheel should be used on the No. 6-5 grinder for carbide work. Three wheel speeds are available on this machine to compensate for change in diameter as ordinary abrasive wheels wear down. However, since the diameter of a diamond wheel does not change appreciably, a speed of 3600 revolutions per minute can be used throughout the life of such wheels. This produces a surface speed of approximately 6100 surface feet per minute, assuming that the mean point of contact between the wheel face and the work is ¼-inch from the periphery of the wheel. Maximum operating speeds are marked on the wheels. Don't exceed those speeds.

Feed range per revolution of work varies from 0.0003 to 0.0018-inch, based on a 3-inch diameter hob, in 0.0003-inch steps. If diameter of work is more than 3 inches, increment feed will be increased proportionately. Reverse is true if work is smaller than 3 inches. Generally, heavier feeds can be used for the roughing operation, while light feed (or no feed at all) is used for finishing cuts. Table speed can also be greater for roughing than for finishing. However, if table speed is so slow that an excessive amount of heat is generated in a tooth, it will lead to cracking or burning of teeth. Table speed will also vary according to the type of carbide being sharpened. Straight tungsten carbide is easiest to grind.

Wet Grinding—One of the distinctive features of the No. 6-5 machine,

CM HERC-ALLOY



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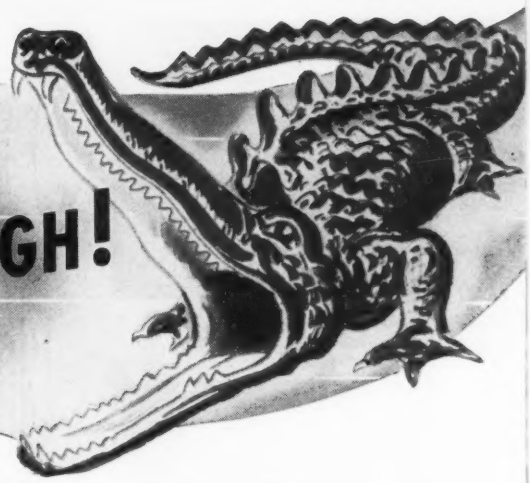

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Lamson "1035" Set Screws

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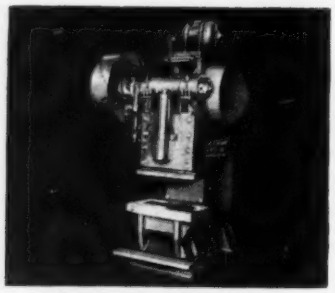
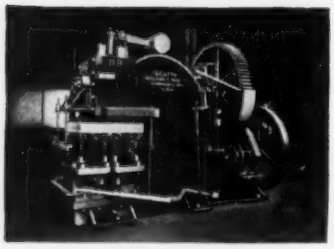
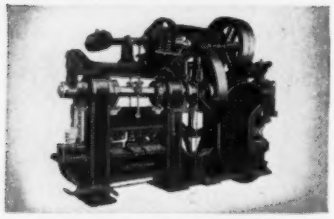


BEATTY Single End Punch available in capacities up to 200 ton.

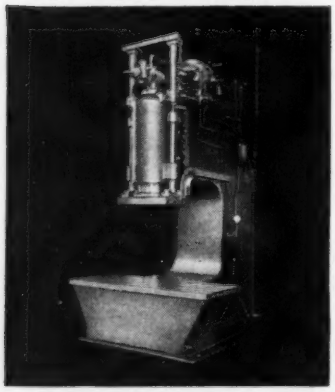


BEATTY No. 11-B Heavy Duty Punch for production tooling and use with BEATTY Spacing Table.



BEATTY Co-Pun-Shear — one unit does coping, punching, shearing.

BEATTY Horizontal Hydraulic Bulldozer for heavy forming, flanging, bending.



BEATTY 250-ton Gap Type Press for forming, bending, flanging, pressing.

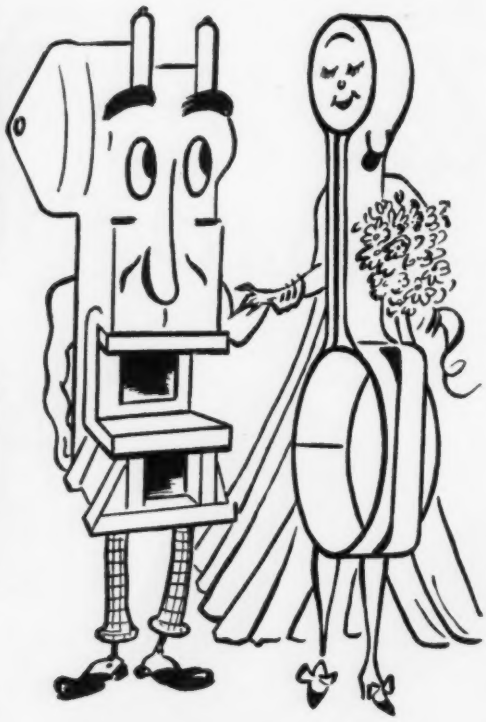


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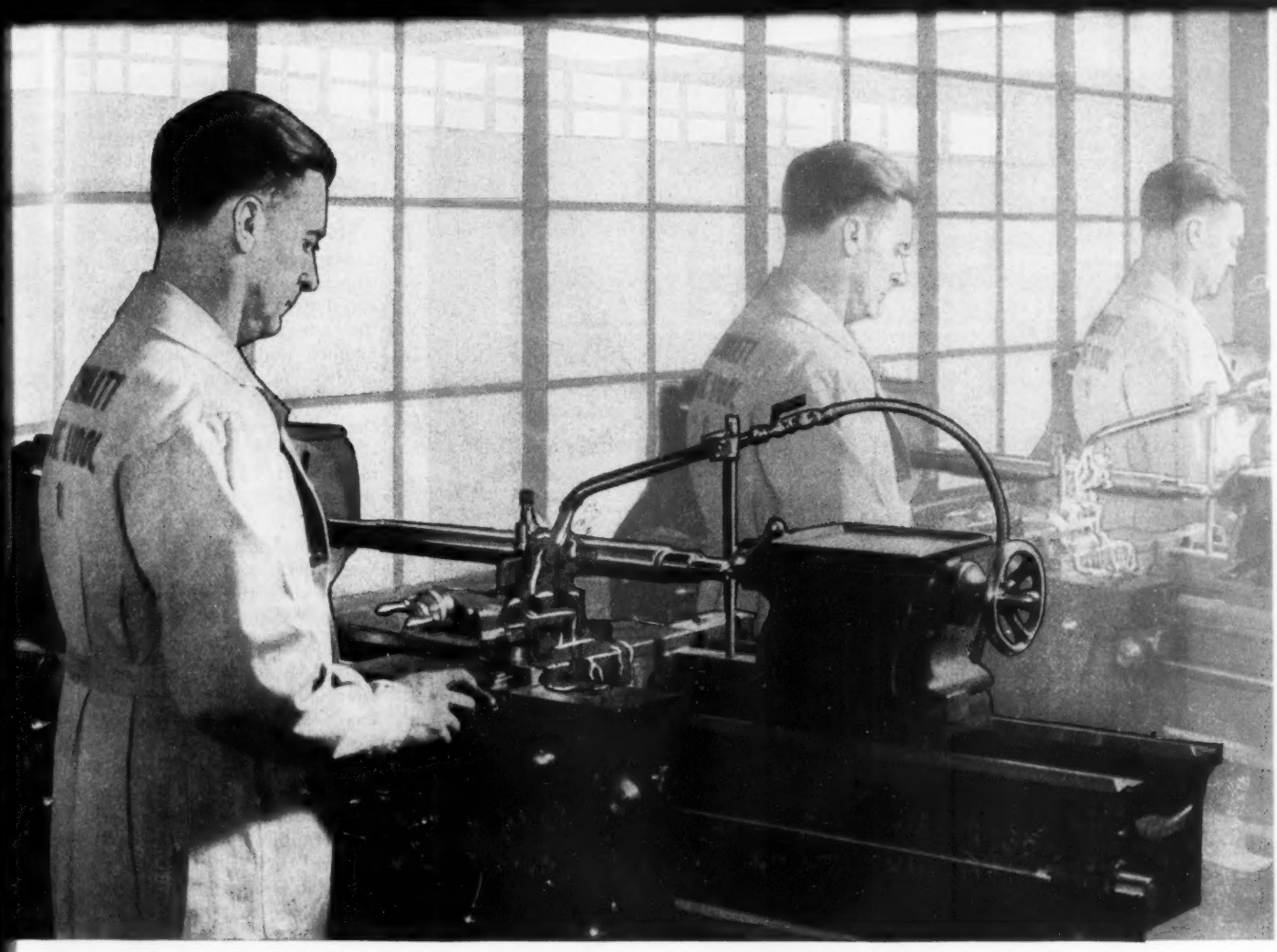
Fig. 1, is its provision for grinding with coolant. Burning or cracking the teeth is practically eliminated when proper coolant is used. Use a good grade of grinding oil of approximately 150-190 Saybolt universal viscosity at 100°F when grinding carbides. A sufficient quantity of this oil directed at the point of contact also prevents loading of the wheel. Too small a flow of coolant or starting to grind before turning on the coolant will result in cracking the carbide.

Tips which have not been properly brazed may be under stress before they are sharpened the first time. This is caused by the difference in the coefficients of expansion of the carbide and the steel body of the hob. Use of a flood of coolant, directed at the point of contact, will minimize the chance of heating the tip so that such stress will be built up to the breaking point.

A vapor collector system is advisable, inasmuch as the hob teeth provide many surfaces for atomizing the coolant. There may also be a considerable amount of smoke when grinding with oil. Don't hook up this vapor collector to the regular exhaust system unless it is of electrical or centrifugal type system which will precipitate the vapor. The ordinary system, which is designed solely to dry grinding dust, will require a special filter to prevent rusting of the ducts.

Truing and Dressing—A diamond cannot be used to true diamond wheels. They must be removed from the machine and trued with an aluminum-oxide or silicon-carbide grinding wheel. The diamond wheel, with adapter, is placed on a taper arbor on the truing machine. Runout of the grinding arbor must be checked. The dressing wheel is driven at approximately 5000 surface feet per minute. Truing is done without coolant. Good results have been obtained by using aluminum-oxide wheels of 180-220 grit and "Q" hardness. If proper care of the wheel has been exercised, no more than 0.003 to 0.005-inch need be removed to correct its form and provide a sharp cutting surface. Indicator reading against the grinding surface should not exceed 0.0002 to 0.0003-inch runout after the wheel is remounted. Angle between the straight and cone sides of the wheel should be 25°±5′.

Since coolant should prevent loading, the only time a wheel should have to be trued is when its form has been worn enough so that the limits cannot be held. However, if the wheel has loaded up or if its bond



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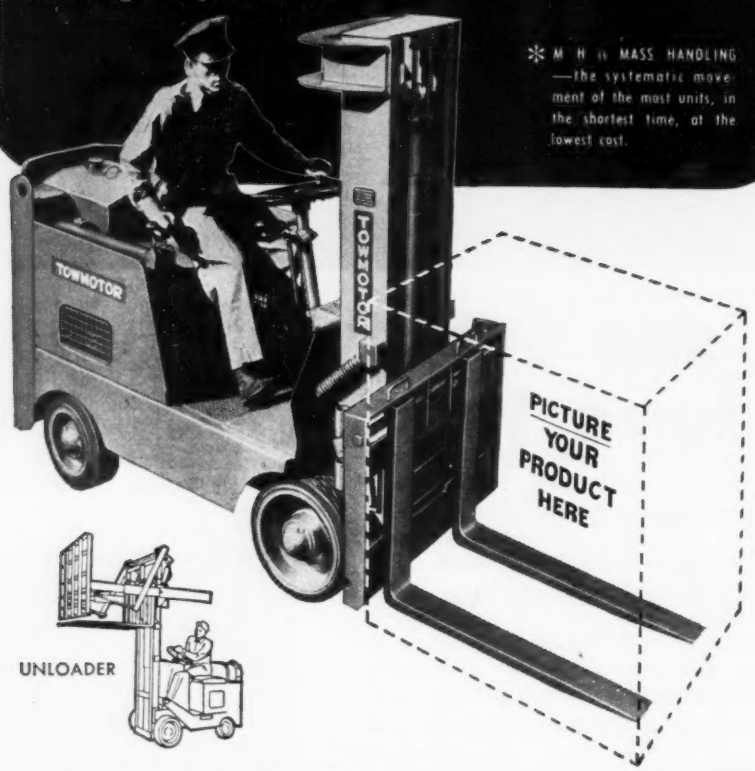

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has burned, it can be opened with a pumice stone or a dressing stick made especially for diamond wheels. The pumice stone is best for the finishing wheels and the dressing stick for roughing wheels.

Since they can be trued easily with a diamond dresser, regular abrasive wheels used for sharpening high-speed steel hobs can be removed from the adapter when an operation is finished and remounted again when needed. However, a diamond wheel should be permanently mounted on the adapter and not removed until the wheel is worn out because it must be trued to the adapter so that runout does not exceed 0.0002 to 0.0003-inch. This is done by tapping the wheel radially until it runs true. Very little tapping should be necessary since the hole is held to a limit of ±0.0005-inch.

Inspection—Carbide tips should be inspected several times during the sharpening process. First, as already has been mentioned, they should be inspected carefully under a magnifying glass prior to grinding to determine accurately the amount of stock which must be removed. While it is important to remove enough stock to restore their original accuracy and finish, it is equally important that no more than that be taken off. This demands skill and experience on the part of the operator, as well as a careful inspection.

Bear in mind that the two purposes for sharpening carbide are to give sharp cutting edges to the teeth and to provide smooth finish on the teeth. During the sharpening process, small scratches and flaws may appear on faces of the teeth. Tool life will be increased if all these scratches and flaws are removed. They should all be ground out during the finishing operation. Work should be examined under a magnifying glass by the operator at intervals to make sure that this smooth finish is being attained.

Final inspection should be performed by the man who is responsible for sharpening quality. He should examine the work under a bench microscope to "spot" any fine scratches or imperfections which were caused by—or skipped by—the sharpening operation.

—o—

Revision of the simplified practice recommendation R214-45 on metal-cutting band saws (hard-edge, flexible back) recently approved by the Commodity Standards Division, National Bureau of Standards, has been mailed to producers, distributors and users for acceptance or comment.

Electropolishing Steel

(*Continued from Page* 114)

be used safely without causing temperature to rise unduly.

Wherever more current than this is needed, provisions are usually made for dissipating the heat in order to maintain the treatment solution with the operating temperature range. Good results have been secured by introducing cooling water through the steam coils with a two-way valve. Relocation of cathodes sometimes reduces heat generation also.

Solutions—Solutions currently used for electropolishing stainless steels contain phosphoric or sulphuric acid (or in combination) as the main acidic agents. To these may be added various other acids or chemicals. Among these additives are citric, chromic, tartaric and benzoic acids, alcohol, glycerol acid, benzene and commercial inhibitors.

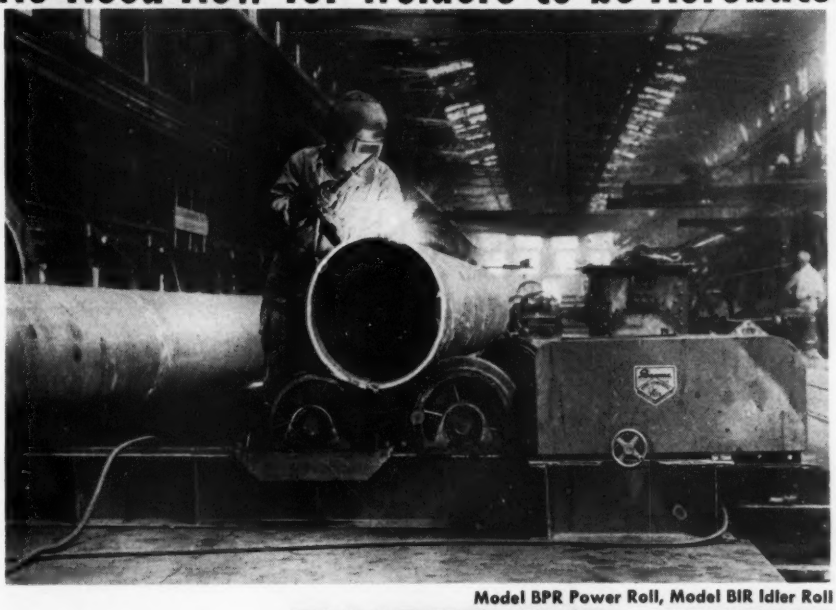
Solutions made up with these materials are fairly easy to handle for the most part. They have low electrical resistance and operate at low voltages, usually not over 25 volts. Operating temperature ranges from 150 to 300° F, depending on constituents of the solution. The higher the temperature, the lower the current density needed.

Of the most successful techniques presently in widespread commercial usage for uniformly bright finishing stainless steels, two are especially noteworthy. The first, developed jointly by Armco Steel Corp., Middletown, O., and E. I du Pont de Nemours & Co. Inc., Wilmington, Del., employs either a citric-sulphuric acid solution or a glycolic-sulphuric bath. Also the direct result of extensive Armco technical research and engineering exploration, the second method uses a phosphoric acid-butyl alcohol solution. Both processes (patented) have their particular advantages for certain applications.

Procedure—Part or fabricated assembly to be polished, made the anode by connecting it to the positive current lead with suitable clamps or holders, is submerged in the electrolyte so that all parts of the anode are located from ½ to 6 inches from a cathode element. Negative current lead is attached to the cathode system in the bath. Proper location of cathode elements in relation to the work promotes finish uniformity. Foaming, if it occurs, may be controlled by a de-foamer such as Stenol.

Agitation of the work, while not regarded as an absolute necessity, is nevertheless a definite aid, reducing streaking tendencies and increasing

No Need Now for Welders to be Acrobats



Model BPR Power Roll, Model BIR Idler Roll

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Ransome TURNING ROLLS

Welders can make all welds "down hand" with heavier electrodes when Ransome Turning Rolls bring the work into convenient working position for *increased production* and *neater, better welds.*

The improved Ransome line includes three models, with standard capacities from 3 to 45 tons, up to 14 feet in diameter, stationary or self-propelled. (Rolls for heavier or larger work also available.)

Ransome features for trouble-free operation: *unobstructed loading* from either end, due to lowered drive mechanism • *easy rotation* under heavy load, due to anti-friction self-aligning bearings (Models B, C) • *strength where most needed*—exclusive combination bronze and steel reinforced worm wheel • *quick adjustment* for varying diameters • *adjustable variable speed rotation.*

Send coupon for bulletin.

INDUSTRIAL DIVISION
Ransome
MACHINERY COMPANY
DUNELLEN, NEW JERSEY
A SUBSIDIARY OF
WORTHINGTON PUMP AND MACHINERY CORPORATION

50% PRODUCTION UP
LABOR COSTS DOWN
TURNING ROLLS
WELDING POSITIONERS

Ransome Machinery Company
Dunellen, N. J.

Please send Bulletin 228-4 on Ransome Turning Rolls.

Name.....

Company.....

Address.....

YB-7

"MULTICUT" "TUFCUT" "HOT WORK"
Wapakoneta
SHEAR BLADES
and ROTARY KNIVES
Any type or size blade of proper Alloy with correct hardness and temper for every type shearing machine and every kind of job.
Rx ENGINEERED TO THE JOB
Every Wapakoneta blade is made to exact specifications, designed for the particular job. Complete records with order number of each blade makes possible duplication of exact size and temper at any time.
The WAPAKONETA MACHINE CO.
Shear Blade Specialists Since 1891
Wapakoneta, Ohio

anodic efficiency. Only mild agitation is recommended, however, as the greatest solution of metal occurs where turbulence is greatest. Large surfaces, such as sheets, are not polished as readily as bars, wire and small formed articles. On large flat areas electropolishing will expose surface defects not ordinarily visible.

Racking and current distribution problems in electrochemical polishing are similar to those of electroplating with a chromium bath. Wherever small parts may be hooked or clamped conveniently, they can be batch-polished simply by loading many pieces on racks. Large parts require individual racking. In plants equipped with continuous high-production units, parts are clamped to a moving electrode system and loaded and unloaded continuously in much the same manner as in electroplating.

While the nature of the part determines the exact equipment set-up in any instance, no special racking procedures have been found necessary in the majority of cases. As a general rule, work can be hung in the processing tank with suitable contact and parts will polish.

In electropolishing odd-shaped parts with sharp angles, grooves, or hard-to-get-at surfaces, however, the problem of gas entrapment may be encountered. In such instances, work is insulated and protected areas are not polished. Racking the parts in such a way to prevent the formation of these "gas traps" offers the most practical solution to the problem. In large semiautomatic installations, motion of work flowing through the electrolyte generally prevents gas from accumulating in these traps. In small stationary tanks, however, the solution may be agitated either mechanically or with compressed air whenever required.

Advantages—The process provides the following advantages:

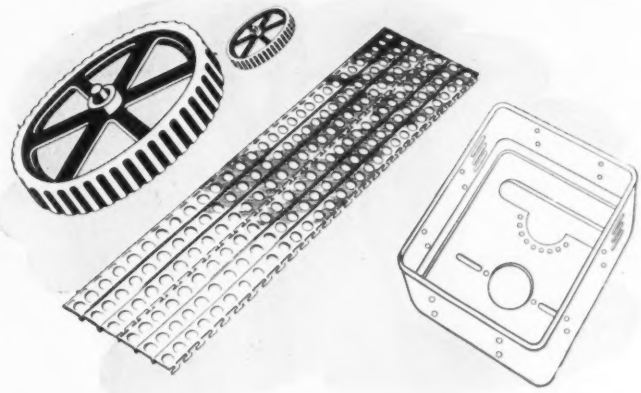
1. Beauty and Durability—Surfaces are free of embedded particles, light scale and other foreign substances. Electropolishing also improves corrosion-resistance by removing discolorations arising from roller seam or spot welding and also by passivating the entire surface.

2. Adaptability—A wide range of work is handled economically and with equal facility on small parts, intricately formed items, wire assemblies and welded goods.

3. Primary Polishing—Where surface imperfections are either slight or not regarded objectionable in the finished product, electropolishing can replace many primary polishing steps. Deep scratches and gouges are eliminated only through grinding and mechanical polishing. By combining electrolytic polishing with light color buffing, highly reflective

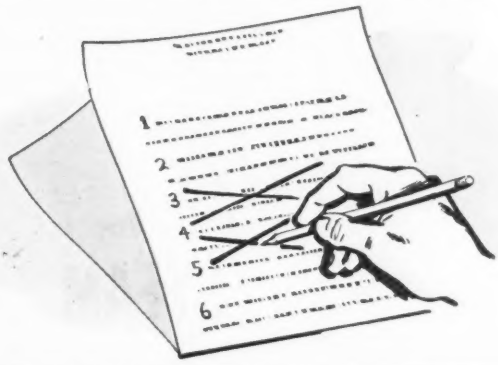
You can clean parts like these in one minute...

With Vapor Degreasing! Oil and grease are quickly and thoroughly removed from parts made of metal, plastics, glass and many other materials, regardless of size or shape. For the solvent reaches into deep draws, holes and almost inaccessible places, removes grease and oil, and leaves the parts clean and dry . . . ready for finishing or further fabrication.



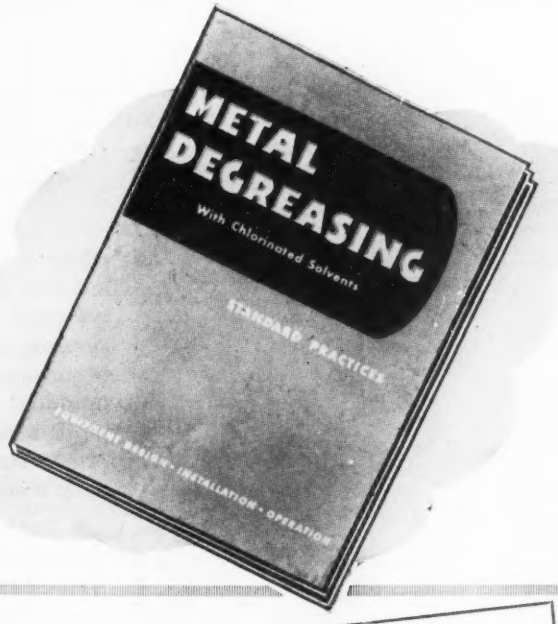
And save production steps

Vapor Degreasing, used alone or as part of the assembly line, speeds production and simplifies cleaning . . . for accurate inspection during machining operations or assembly . . . or for preparing clean surfaces for subsequent decoration or finishing. Whether your plant is large or small, you'll find substantial savings in time and cost with Vapor Degreasing.



This book gives you the whole story

Tells how Vapor Degreasing may be safely and economically conducted. Shows clearly why no other cleaning method can match the results obtained with Vapor Degreasing. Shows typical compact, scientific equipment, which is available for efficient operation. And it gives information on solvents used with this equipment—Du Pont Trichlorethylene and Perchlorethylene—which under various trademarks have been widely used for many years. Send for this book today! Mail the coupon to E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington 98, Delaware.



DU PONT *Non-Flammable* **SOLVENTS for VAPOR DEGREASING**

SOLD NATIONALLY THROUGH DISTRIBUTORS

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REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Department
Wilmington 98, Delaware

Please send me my copy of "**Metal Degreasing—Standard Practices.**"

Name_____ Position_____

Firm_____

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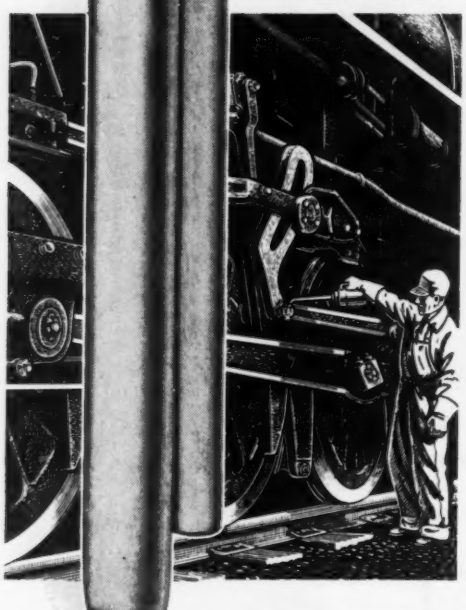
Tune in to Du Pont "CAVALCADE OF AMERICA," *Monday nights—NBC coast to coast.*

for a

STEAM LOCOMOTIVE

...or a TOY ONE

Cotter pins! Here's one 18 inches long that weighs over two pounds. Again—there's a box of 1,000 that weighs a little over an ounce. Everyone knows some of their uses. No one knows them all.



• AMERICAN CHAIN makes cotter pins in two basic styles, ACCO with extended prong or even ends, and CAMPBELL which is self-spreading. There are over 400 variations of size, type and material. The materials are steel, stainless, brass, bronze and monel. Although produced by the million, each pin is as straight and as accurate to size as though individually made.

• Look to AMERICAN for all types of electric welded and forge welded chain—weldless chain made of formed or stamped links—a complete line of fittings, attachments and assemblies—repair links.

Buy AMERICAN—the *COMPLETE* Chain Line

ACCO

York, Pa., Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Bridgeport, Conn.

AMERICAN CHAIN DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

In Business for Your Safety

finishes sometimes may be secured economically.

4. Burr Removal — Electropolishing effectively removes or minimizes burrs on all types of work.

5. Decorative Designs—Permanent two-tone polished effects or decorative designs can be applied to stainless sheets. Areas scheduled to retain their original finish are simply masked with a suitable stop-off lacquer. After the desired degree of luster has been produced on unmasked sections, the protective coating is removed with a solvent. Sandblasting, shotpeening, or etching may precede electropolishing to produce a wide variety of effects in uniform or design finish.

6. Economy—Frequently, finishing constitutes a major item of cost in producing stainless steel articles. In many instances, use of electropolishing has effected substantial economies.

7. Finish Uniformity—With time, current density and other operating variables standardized and closely controlled, a consistent, identical degree of luster is obtained on production work. Operators cannot burn or discolor work by trying to speed-up processing. Luster is governed by current and temperature of the electrolyte.

When considering the use of electropolishing for finishing any specific part or product, a careful study comparing the economics of this technique with costs of other standard mechanical surfacing methods should be made since each individual article represents a distinct case by itself. In some instances, work may be finished at lowest unit cost by processing with a series of polishing operations in which both mechanical and electrochemical means are utilized; in others, tumbling may produce a satisfactory finish more economically than electropolishing; while in still others, parts can be readily brightened at far less cost electrolytically.

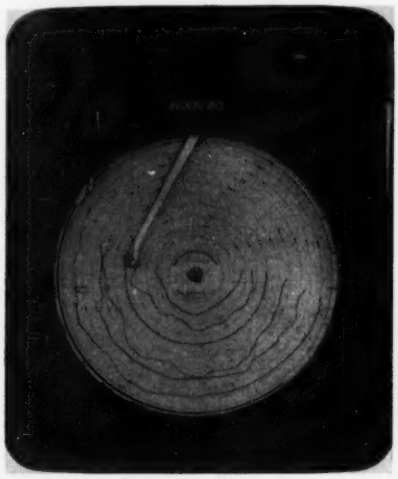
—o—

In a 32-page booklet issued by Farrel-Birmingham Co. Inc., Ansonia, Conn., is an account of the company's founding, growth and present status. Commemorating the 100th anniversary of the founding of the plant in Ansonia, the booklet pays tribute to the founders who set up the predecessor companies—Birmingham Iron Foundry and Farrel Foundry & Machine Co., founded in 1836 and 1848, respectively. The present company, having served through four major wars, now manufactures a variety of products, including rolls, rubber and plastic machinery, gears and gear units, grinding machines and rolling mill machinery.

New Products and Equipment

Multirecord Recorder

Foxboro Co., Foxboro, Mass., is announcing its multi-record Dynalog electronic recorder, a high speed instrument making from one to six different records on one circular chart, the records being of colored dots so closely spaced as to make virtually continuous lines. Instrument has only one measuring system, but a switch-



ing unit automatically brings the varicolored pens into recording position at 6 second intervals, in any sequence desired.

Rotacolor pen wheel, holding the six pens until they are magnetically selected and held in recording position by a single pen, is a feature. It may be used for measurement of temperature, pressure, humidity, liquid level, pH conductivity, speed or other process variables. A special "dry ink" insures clean recording. Operation may be for several weeks without reinking.

Check No. 1 on Reply Card for more Details

Electrical Press Control

Steelweld presses manufactured by Cleveland Crane & Engineering Co., Wickliffe, O., are now available with an optional feature, an air-electric control. With this control, an air cylinder does the work of throwing in the clutch. The air cylinder can be actuated by hand button, foot switch or various combinations of both. It provides a safety feature when two or more men work simultaneously on a press, permitting operation only when all operators are ready.

A selector is usually incorporated in an air-electric control circuit to provide various ram movements such as long and short stroke, continuous operation and inching. For instance, it may be set to stop the ram on the down stroke just before the upper die reaches the lower one, or it may stop the ram at the top of each stroke.

Check No. 2 on Reply Card for more Details

Vacuum Cleaners

Tornado heavy duty vacuum cleaners, made by Breuer Electric Mfg. Co., 5100 Ravenswood Ave., Chicago 40, Ill., are built in four sizes, powered by 2, 3, 5 and 7½-horsepower motors. They have static water lifts ranging from 60 to 105 inches and air velocities from 315 to 480 miles per hour moving 200 to

360 cubic feet of air per minute. Units may be moved anywhere on their three 8-inch ball bearing casters.

Feature of the machine is a self-cleaning air filter of approximately 1000 square inches. Filter is located in the vacuum head and may be operated by the vacuum-blowing lever even when it is running to same cleaning time. Wet, dry or oily substances can be picked up without harm to filter. All sizes have two intakes for 1½ or 2-inch hose. Suction is ample for operation with 60-foot hoses. Tank capacity is 60 gallons.

Check No. 3 on Reply Card for more Details

Flat Bed Truck

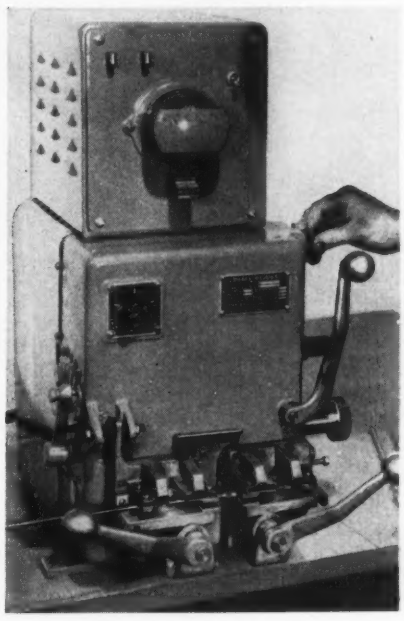
Suited to either mechanized or manual handling, the new all-steel flat bed warehouse truck, made by Garrick Industries Inc., 9018 West Olympic Blvd., Beverly Hills, Calif., is strong, light in weight and maneuverable. The truck bed is 10-gage steel. Five supporting cross bars under the bed prevent it from sagging. A 4-inch steel channel bar, welded under the bed, provides mounting for front and rear hitches used in mechanized trains.

Rear hitch is surrounded by a steel guard rail which prevents it from damaging material it contacts. The front hitch is constructed in a manner that adds to the maneuverability of the truck. As a hand truck, the light weight and ease of movement make for operation without strain.

Check No. 4 on Reply Card for more Details

Flash Welder

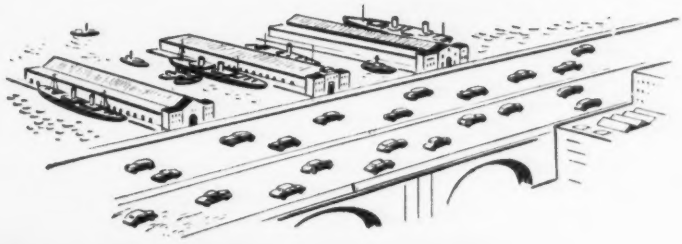
Band saw blades up to 2 inches in width and, with special inserts, wire drill rods, bars, flat stock, etc., up to 5/16-inch in diameter may be joined with the model DBW-5 flash



welder announced by DoAll Co., 254 North Laurel Ave., Des Plaines, Ill. Operations such as salvaging broken tools, welding extensions on drills, reamers, taps, grinding wheels, joining coils or rings and tool room and production operations may be performed.

Weld cycle is motor controlled and fully automatic. Mechanical coordination of welding heat and pressure assures perfect welds of uniform density and purity, independent of operator's experience. A stop on the movable jaw travel prevents any possibility of the jaws making contact which would result in a burned-out transformer. Selective annealing

Confidence



WITH ITS SLEEVES ROLLED UP!

BACK OF SPEEDING LINES OF CARS are bustling production lines. And back of *them* is a vision typically American . . . a vision based on the confidence that industry could devise new techniques and raise our standards of living . . . place the one-time "luxuries of kings" within the reach of everyone.

With confidence like that, Roebling has led the way in developing and making products that are unsurpassed in performance and low operating cost. The confidence our products and engineering have won throughout industry is an asset that every Roebling employee works to preserve.

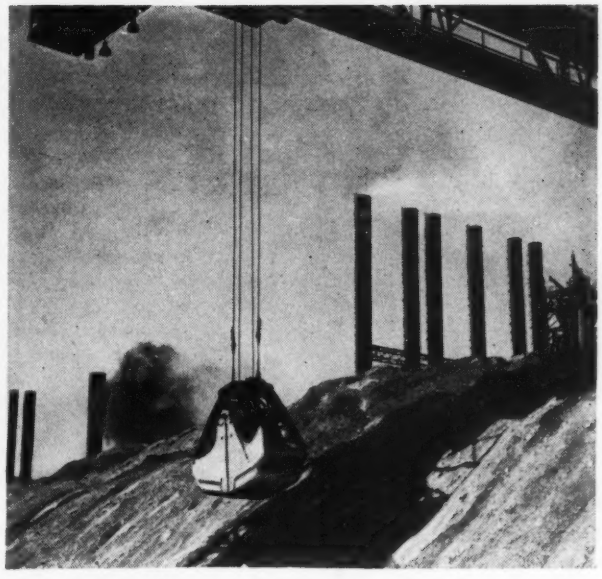
MANY PLANTS HAVE CUT WIRE ROPE COSTS

ROEBLING PREFORMED "BLUE CENTER" STEEL WIRE ROPE slashes costs wherever severe bending is encountered. This has been proved thousands of times *right on the job,* and that's the world's best proving ground! The unequalled combination of Roebling "Blue Center" Steel and Roebling preforming gives you absolute tops in flexibility and wire rope service life.

You'll find that Roebling Preformed "Blue Center" saves time and money in other ways, too. It's easy to handle, for it doesn't twist or kink. You can cut it without seizing. Broken wires lie flat and don't puncture the hands. Most important, it reduces whipping . . . spools uniformly and smoothly.

Your Roebling Field Man can tell you whether Preformed will cut costs on *your* installations. His answer will be impartial, for Roebling makes both Preformed and Non-Preformed . . . a rope that's exactly *right* for every given job. Write or call him at your nearest Roebling branch office.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
Branches and Warehouses in Principal Cities



★ *WIRE ROPE AND STRAND* ★ *FITTINGS* ★ *SLINGS* ★ *SUSPENSION BRIDGES AND CABLES* ★ *AIRCORD, AIRCORD TERMINALS AND AIR CONTROLS* ★ *AERIAL WIRE ROPE SYSTEMS* ★ *ELECTRICAL WIRE AND CABLE* ★ *SKI LIFTS* ★ *HARD ANNEALED OR TEMPERED HIGH AND LOW CARBON FINE AND SPECIALTY WIRE, FLAT WIRE, COLD ROLLED STRIP AND COLD ROLLED SPRING STEEL* ★ *SCREEN HARDWARE AND INDUSTRIAL WIRE CLOTH* ★ *LAWN MOWERS*

ROEBLING

A CENTURY OF CONFIDENCE

JR ROEBLING

heats provide for variations in stock width and thickness. Welding jaws have replaceable wear strips.

Check No. 5 on Reply Card for more Details

Variable Speed Lathe

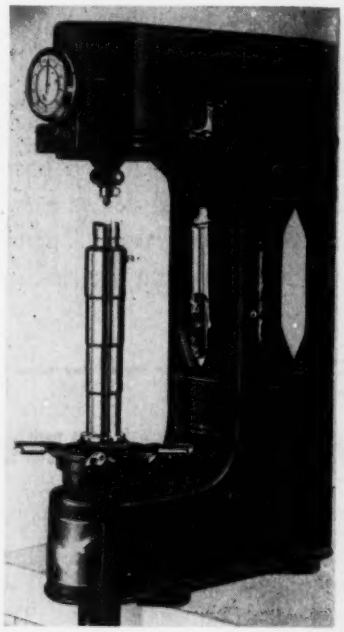
Designed for applications where large, round parts must be polished, deburred or otherwise finished, the type VA4BC-A variable speed lathe, made by Schauer Machine Co., 2081 Reading Rd., Cincinnati, O., has spindle speeds from 100 to 4800 revolutions per minute at a ratio of 6 to 1. This ratio is increased to 12 to 1 with a two-speed motor. Part to be finished is held on a spindle by a chuck, face plate or special fixture, and is revolved at the speed best suited to the part and the operation.

Machine is equipped with a hood which must be drawn forward over the work before the machine can be started. Control is provided by an electrically operated solenoid valve, actuated by a limit switch which is operated by movement of the guard hood. A foot switch controls starting and stopping of spindle. A drip pan, fitted with a rack for holding polishing rods, is standard equipment.

Check No. 6 on Reply Card for more Details

Hardness Tester

Lighter by 65 to 85 pounds with a cast aluminum body, the hardness tester built by Clark Instrument Inc., 10200 Ford Rd., Dearborn, Mich., is used for Rockwell testing of hard and soft steel, brass, aluminum, cast iron



and other metals, alloys and plastics. Other features include a frictionless spindle to assure a correct minor load and a fully enclosed elevating screw protected from dust, grit and rust.

Incorrect major load, sometimes caused by friction or drag of the tripping lever on the loading beam, is eliminated by a zero drag tripping lever. The lower part of the enclosed elevating screw serves as an oil reservoir. Testers are available in three standard models: 8, 12 and 16-inch vertical capacity.

Check No. 7 on Reply Card for more Details

Vibrating Hearth Furnace

Designed specially for hardening small parts, the continuous flow vibrating hearth furnace, built by Lindberg Engineering Co., 2444 West Hubbard St., Chicago 12, Ill., is built for temperatures to 1800°F. It is heated by heavy nickel-chrome elements. The vibrating of the hearth moves the work through the work chamber to a chute through which the parts fall into the quench.

With the vibrating hearth, parts flow by high frequency vibration instead of hipping as the result of in-

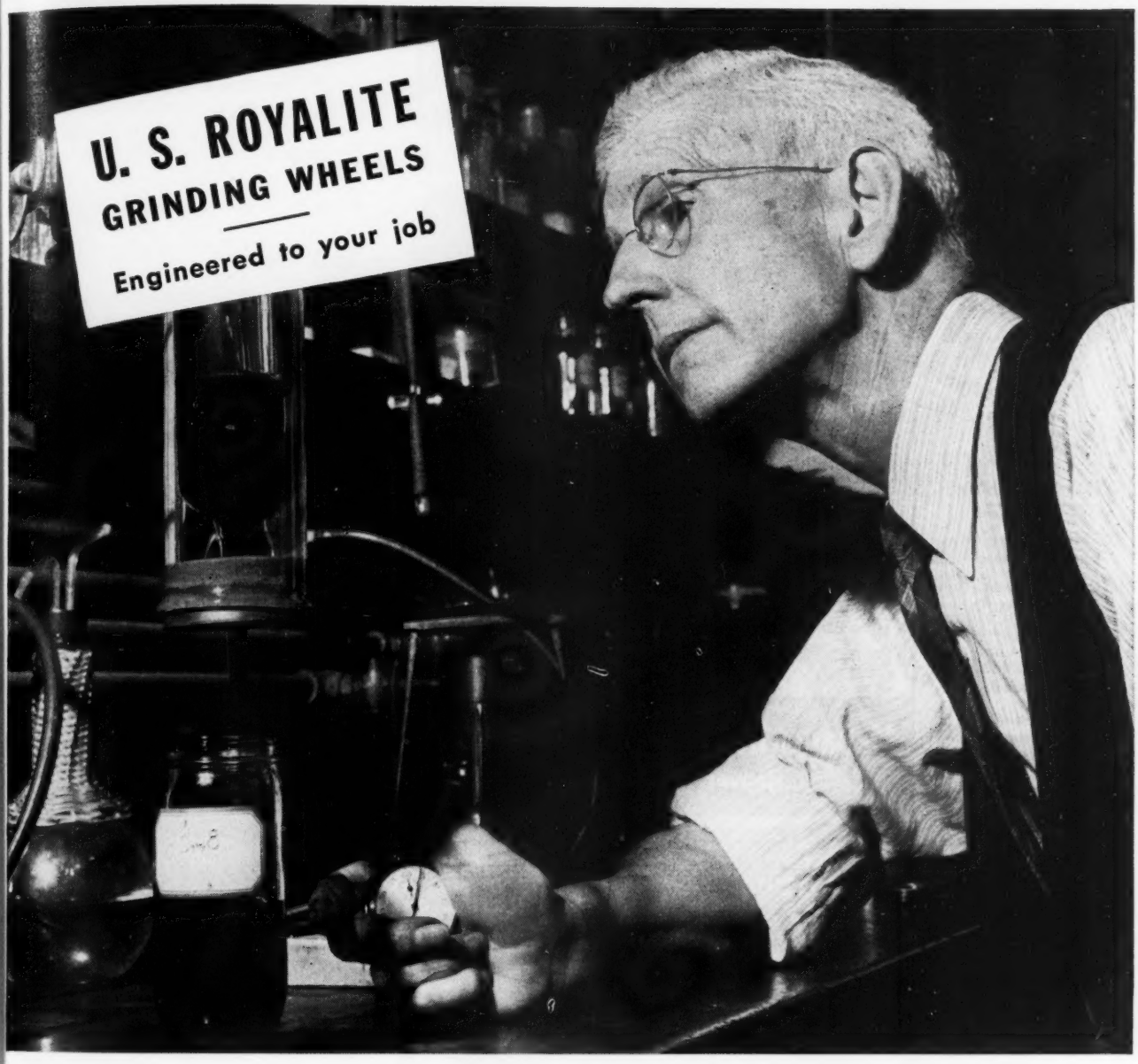
IF you're looking for a heavy-duty, rigidly constructed, all-purpose press for assembly and disassembly of large gears, rolls, armatures and similar parts in general machine shop work, it will pay you to consider the R. D. Wood Hydraulic Wheel Press. This press requires no pit, and it has self-contained pumping unit and controls. A pneumatic pull-back device eliminates counterweights and gives a faster rate of ram return than is obtainable on ballast-weighted devices. Years of R. D. Wood design ingenuity are built into this press . . . your assurance of quick, economical, *dependable* performance of vital general shop work. These Wheel Presses are available in capacities ranging from 100 tons to 1000 tons, with tie-bar clearances ranging from 48" to 120". Send for literature *today*, and remember R. D. Wood engineers are always available for consultation on *all* hydraulic press problems.

HYDRAULIC PRESSES AND VALVES FOR [illegible] • ACCUMULATORS • [illegible] • INTENSIFIERS

EST. 1803

R.D. Wood Company

PUBLIC LEDGER BUILDING, PHILADELPHIA 5, PA.



An old timer talks about Grinding Wheels...

You're looking at a test of the kinetic viscosity of liquid resin—one of many tests made to be sure you get a grinding wheel that is just what you've asked for . . . and more.

The purpose is always the same—*more production at lower cost*. We draw from our immense research facilities in every conceivable phase of abrasives and bonds. In addition, we have at our disposal the vast research data covered by the thousands of other products made by United States Rubber Company.

That is why we can deliver U. S. Royalite Grinding Wheels that are precisely engineered to your job, whether you're snagging castings, grinding ball races or working with billets, bits, slabs or sauce-pans. We can give you accurate grinding wheel costs in advance—by means of thorough field tests made by our engineers right in your own plant.

For more information, write United States Rubber Company, Grinding Wheel Dept., Fort Wayne 4, Indiana.

U. S. GRINDING WHEELS—ORIGINATED IN 1863

PRODUCTS OF

U.S.RUBBER
SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

Because of their superior performance McDanel high temperature combustion tubes are preferred by metallurgical laboratories from coast to coast. McDanel Tubes are laboratory controlled from the mixing of the batch to the grinding for stopper tightness. Proper density, accurate bore size, wall thickness, etc. must be right before tubes are passed for shipment. That is why McDanel Tubes serve better and last longer and that is why McDanel Tubes are so generally preferred.

Straight, tapered, or double reduced self-cooling ends.

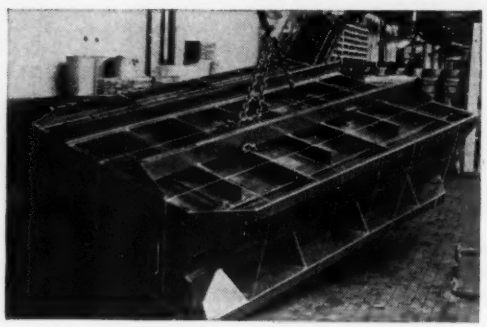
OTHER McDANEL PRODUCTS

- Self-cooling Combustion Tubes.
- High Temperature Combustion Tubes.
- Refractory Porcelain Specialties in stock or designed to meet specific needs.

Specify McDanel High Temperature Combustion Tubes from your supplier.

McDanel Refractory Porcelain Co.
Beaver Falls . . . Penna.

Nested dump truck bodies Gerrard Steel Strapped for island of Madeira. Savings by nesting and elimination of wood crates — nearly $25.00.



"THE NEW TWIST"

. . . saves time, material, money!

It is a simple, easy operation to tension, tie and cut Gerrard Steel Strapping with any Gerrard machine. Employees do not have to bother with seals or crimping. And because Gerrard Strapping is round and smooth, it is easy and safe to handle, does not cut the hands. The speed of Gerrard binding procedures saves time on every job. Low cost per lineal foot keeps material costs down.

Gerrard's exclusive twist is, in effect, a sturdy steel knot which holds your shipment firm and secure until it reaches its destination. A wide range of sizes permits the use of Gerrard Steel Strapping for light parcel post packages or carload shipments of steel pipe, plate, drums, machinery, and on all types of palletizing.

Gerrard engineers will gladly consult with you *without charge* about your packaging problems. Write for a free copy of *Blue Book of Packaging.*

USS STEEL UNITED STATES STEEL

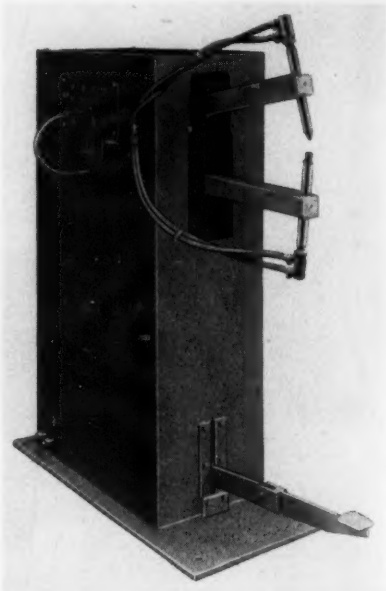
Gerrard Steel Strapping Company
(Formerly The Gerrard Company, Inc.)
4709 South Richmond Street, Chicago
UNITED STATES STEEL

termittent abrupt impulses. Movement of the hearth is not perceptible to the eye and there is no jarring of the furnace equipment. Provided with the furnace is an oil quench tank or a salt quench tank for martempering or austempering operations.

Check No. 8 on Reply Card for more Details

Spot Welders

Fast, economical production is possible with the line of electro-weld spot welders developed by Electric-Arc Inc., Newark, N. J. Illustrated is a heavy duty unit featuring 8-step current control permitting 75 per cent secondary voltage adjustment. Elec-



trodes are standard size, water cooled and easily removed.

Equipment includes a spring-loaded foot switch, ample ventilation and arc welded steel casing with removable top and rear door for ease of inspection. It operates on 220 volts, 60 cycles, single phase alternating current. If desired, units can be furnished with magnetic contactors and weld timers.

Check No. 9 on Reply Card for more Details

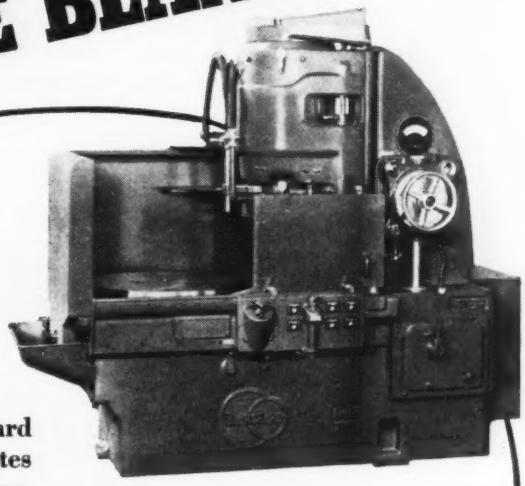
Flexible Couplings

Lovejoy Flexible Coupling Co., 5071 West Lake St., Chicago 44, Ill., is manufacturing a line of heavy duty flexible couplings designed for direct current mill motors. Built to standards adopted by the Association of Iron and Steel Engineers, the couplings are made so that no lubrication is ever required.

Couplings are built for every duty and every kind of service from 1/6 to 2500 horsepower. The tough long-lasting cushions are made of various

BRAIDER PLATES BY ANY OTHER METHOD A "Toughie" MACHINING JOB a "Quickie" when they....

....PUT IT ON THE BLANCHARD



No "sissies" are these Braider Plates—hard cast iron — 18″ O.D, 4″ I.D., .300″ thick — in the difficulty of machining flat, parallel, and to size—all to a tolerance of ± .001″. (That is, by any other method except on a Blanchard.)

On the 42″ chuck of a No. 18 Blanchard Surface Grinder, 8 of these Braider Plates (16 surfaces) are produced per hour.

And it's done (a) by clean-up of first surface (b) turning to finish-grind the other surface (c) turning to finish-grind the first surface. Total stock removal 1/32″.

Saving in stock removal by Blanchard Grinding, compared with any other method of machining, is equal to two extra plates for every three plates ground.

Do you know of any other method that would equal this result in time and cost?

If you do flat surface grinding, let us analyze your problems with a view to your getting the most out of every grinding dollar.

Send for your free copy of "Work Done on the Blanchard", third edition. This new book shows over 100 actual jobs where the Blanchard Principle is earning profits for Blanchard owners.

BLANCHARD

The BLANCHARD MACHINE COMPANY

64 STATE STREET, CAMBRIDGE 39, MASS., U. S. A.

materials, each best suited to its particular service. Cushions are free-floating and suspended between metal jaws. They are free to adjust instantly to misalignment, shock, surge, oscillation, backlash and vibration.

Check No. 10 on Reply Card for more Details

Gear Loading Devices

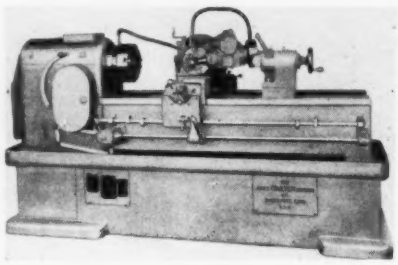
Idle time per machine is automatically reduced to 2 seconds per gear or less with the line of automatic loading devices for gear finishing machines, developed by Michigan Tool Co., 7171 East McNichols Rd., Detroit, Mich. Devices are designed for use on both rack and rotary type gear finishing machines and also may be applied to Michigan machines already in use. It is unnecessary even to use arbors for mounting of gears and pinions between centers. Stripping from the center is also automatic.

In general, loaders fall into three major classes: Gravity chute feed and unload type, for smaller gears; chute feed plus indexing mechanism; jaw type loaders for larger gears and cluster gears. All provide electrical and mechanical interlocks to interrupt sequencing of the machine cycle in case any part of the mechanism should fail to operate properly.

Check No. 11 on Reply Card for more Details

Thread Milling Machine

James Coulter Machine Co., Bridgeport, Conn., is building a model TM Threadmaster thread milling machine of the single cutter type for the threading of long operating screws with threads too long to be produced



by the multiple thread milling cutter method. Machine has 58 different speeds, changed by means of pick-off gears. Cutter spindle is driven by a 2-speed motor which will give cutter speeds up to 300 revolutions per minute when using high speed steel cutters and up to 900 revolutions per minute with carbide tipped cutters.

With standard gears furnished, U.S. form, Acme and worm threads from 1 to 20 per inch can be cut. When cutting multiple threads leads from ½ to 3 inches are possible. Machine has capacity for swinging work of 10 inches in diameter over the cross slide or 16 inches over the ways of the bed. A 4-inch hole in the spindle allows use of air-operated chucks. It is being produced in sizes to accommodate work between centers of 24, 42 and 60 inches.

Check No. 12 on Reply Card for more Details

Milling Gear Head

Number of present speeds can be doubled with the two-speed gear head for attachment to any portable milling head, developed by Olson Industrial Products Inc., 40 West Water St., Wakefield 59, Mass. With it two ratios are available—1 to 1 and 6 to 1. Use allows all the original speeds with additional low speeds in proportion to present pulley.

Gear head was originally designed for a Bridgeport miller to allow a greater range, but it can be made to fit any similar type portable milling head. Tool life will be prolonged due to use of proper speed, smoother finishes can be attained and large cutters can be used with installation

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of the gear head. A flexible connection between motor and gear head allows for easy mounting and no cramping of motor shaft.

Check No. 13 on Reply Card for more Details

AC Welder

National Cylinder Gas Co., 840 North Michigan Ave., Chicago 11, Ill., is introducing a line of 12 Sureweld alternating current welders, seven of which are for high speed, heavy duty fabrication. Features include a four-coil transformer with moveable magnetic shunt which assures good welding characteristics at every point within the output range and correct

ratio of open circuit to arc voltage, a provision that means faster burn-off, proper penetration and correct breakdown of usually hard-to-handle alloy rods.

On both industrial and shops models high potential secondary circuits assure ample dielectric strength, tested to withstand 7000 volts. Precise welding heat needed is provided by a stepless full range output control. Output current is infinitely variable throughout the entire range. Optional controls are available on industrial models to meet special products. Shop units are mounted on large rubber-tired wheels.

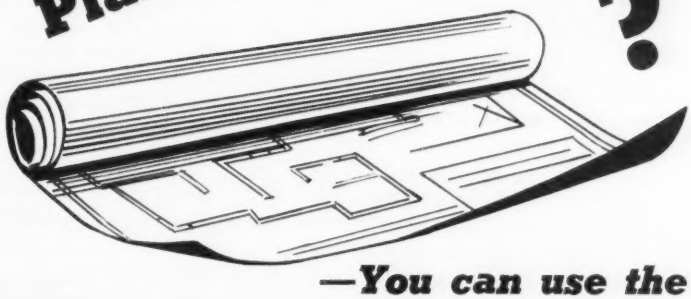
Check No. 14 on Reply Card for more Details

Lifting Jack

Fifteen tons can be lifted or otherwise moved with the Shorty ball bearing screw jack offered by Duff-Norton Mfg. Co., 2709 Preble Ave., Pittsburgh 30, Pa. With a 7-inch height and weighing 22 pounds, the jack utilizes a ball thrust bearing. Housing is of one-piece malleable iron and features machined, cut and heat treated gears.

Ram is made of seamless tubing

Planning a brand new PLANT ?



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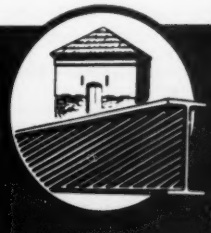

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New York, N.Y., 441 Lexington Ave. Columbus, Ohio, Huntington Bank Bldg.

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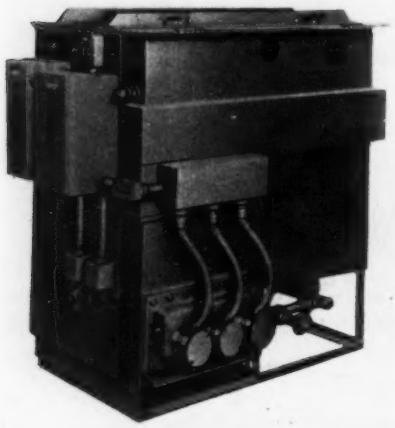
fitted with a high strength bronze nut and the screw is heat treated and fitted to the gear which is supported on the ball thrust bearing. The 1⅛ x 36-inch pinch bar end lever makes the jack quick operating and easy to handle when low height and great capacity are required.

Check No. 15 on Reply Card for more Details

Degreaser

The 625 degreaser, announced by Detrex Corp., Detroit 32, Mich., is a two-dip hand-operated unit designed for rapid, safe and thorough cleaning of up to 1000 pounds of steel parts of medium size in 1 hour. The unit can be heated by steam, gas or electricity or it can be furnished for combined gas-steam or gas-electric heating.



Unit employs the immersion-solvent-vapor degreasing process which removes grease, oil and similar materials rapidly, leaving all surfaces, external and internal, clean and dry. To operate parts are lowered into boiling solvent, transferred within the machine to a cool solvent rinse compartment and, after a few seconds, removed through the solvent vapor zone. The solvent used is nonflammable and cannot explode. All welded, reinforced steel tank has a sprayed-on zinc coating on all interior surfaces. Parts that will fit into a space 18 x 21 x 12 inches can be cleaned.

Check No. 16 on Reply Card for more Details

Fork Truck

Offered by Automatic Transportation Co., 149 West 87th St., Chicago, Ill., is a low cost battery-powered fork truck which has most of the features of larger trucks made by the company. Features include drive on the load wheels, high pressure hydraulics, automotive type controls, dead man control, full contactor control, lifts, tilts and drives simultaneously and road clearance for boxcar loading and severe ramp conditions.

Its telescopic lift mechanism enables it to raise its load to 130 inches, despite its overall height of 83 inches. Capacity of the truck is 2000 pounds with a 48-inch load or 3000 pounds with a 28-inch load. Batteries are interchangeable with those that are used in other trucks made by the company. Carrying a 36-inch load, the truck is able to right angle stock in 9 foot aisles. Overall length is 97¾ inches.

Check No. 17 on Reply Card for more Details

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WELDING ROD: Eutectic Welding Alloys Corp., New York 13, N. Y., announces Eutecrod 16 in 1/32-inch size for tight steel joint welding. It may be used in ring form, preplaced and heated, either by torch or induction heating.

Check No. 18 on Reply Card for more Details

FLAME FAILURE SAFEGUARDS: Two Fireye systems, FF-2 and FF-6, are offered by Combustion Control Corp., Cambridge, 42, Mass. System FF-2 is used on oil burners which use gas as an alternate fuel. It consists of Photoelectric scanner type 45PH5, electronic flame rod type 45-JP1 and programming control type 24PJ8. System FF-6, used on gas burners which use light oil as an alternate fuel, includes electronic rod type 45JQ1 and control type 24QJ5.

Check No. 19 on Reply Card for more Details

WELDING HAND SHIELD: American Optical Co., Southbridge, Mass., offered a new lightweight, seamless welding hand shield for use where a welding helmet is not practical and on tack welding and set-up work.

Check No. 20 on Reply Card for more Details

TWIN RAIL BASE: In the twin rail base offered by Korfund Co. Inc., Long Island City 1, N. Y., separate base construction is made practical with resilient Adjusto-Chocks to maintain positive alignment. Final selection of drive-center distance, motor position, fan rotation and hold-down bolt location can be determined right on the job.

Check No. 21 on Reply Card for more Details

MAGNETOMETERS: To uncover and measure magnetic forces, show where and how much demagnetizing will be necessary to neutralize them, Thomas E. Smith, Consulting Engineers, New York 17, N. Y., has developed magnetometers. They are available in three models, each adapted for specific job: Material inspection, to measure amount of residual magnetism in steel parts or assemblies; precision analysis of magnetic fields in aircraft; and determination of amount of magnetic influence where a magnetic compass is installed on a plane or ship.

Check No. 22 on Reply Card for more Details

MICROMETER ATTACHMENT: Rimat Microdapter is an attachment for outside micrometers which makes possible the measuring of internal dimensions. It can be installed or removed in less than 1 minute. Of all steel construction, the device is offered by Richards Machine Tool Co., Glendale, Calif.

Check No. 23 on Reply Card for more Details

INDUSTRIAL WHEELS: A new line of cast aluminum industrial wheels is offered by Pikes Peak Aluminum Foundry Inc., Colorado Springs, Colo. They feature split-type construction and are cast in permanent molds from new ingot. They can be furnished with bearings or machined to special bearing specifications, and are available with or without tires.

Check No. 24 on Reply Card for more Details

FILTER UNITS: Filter units rated for service at 1000 and 10,000 pounds per square inch are offered by Micro Metallic Corp., Brooklyn 7, N. Y. Filter containers are provided in carbon steel or stainless construction. Filter elements are all stainless.

Check No. 25 on Reply Card for more Details

REPAIR ALLOY: Lo-Temp, offered by John Hewson Co., New York 5, N. Y., is a permanent repair alloy that handles like putty at only 300 degrees and fuses with metal surface under repair. It will not corrode, run, crumble, shrink or dry out and works with any metal except aluminum and its alloys.

Check No. 26 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

PRODUCTION— Steel is pouring from the furnaces in record-breaking volume. More metal was produced in October than in any month in history, either peace or war, and with producers pressing to maintain operations through the remainder of the year at, or above, the current high rate, around 99 per cent of capacity, indications are ingot output this year will exceed 88 million tons, a new peacetime record.

The all-time high was hit during the war year, 1944, when production totaled 89,641,600 tons. In the first 10 months this year 72,960,936 net tons of ingots were produced, almost 2,700,000 tons more than in the like period of 1947, and only 3 per cent under the comparable period in record 1944.

OPERATIONS— Ingot operations held at the record peacetime high level last week with the national ingot rate estimated at 99 per cent of capacity.

RAW MATERIALS— Some improvement in steelmaking raw materials supply conditions is noted. This is especially true with respect to scrap with steelmakers reporting stockpiles the best in many months. The improved supply position is reflected in steady prices on steelmaking grades. In part, this is attributable to the increasing flow of scrap from Europe. Meanwhile, foundry grades of scrap are showing continued price strength.

The pig iron situation also appears slightly improved. Production is up with several stacks that had been idle for repairs again in blast and pressure from the foundry trade showing signs of easing. In general, demand for iron is still far in excess of supply.

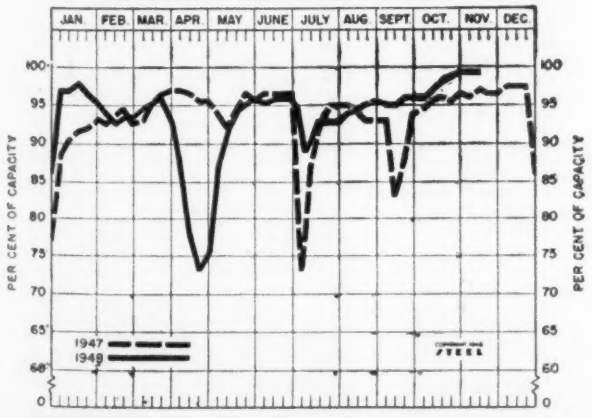
DEMAND— Pressure of consuming demand continues unrelieved in all areas of the market. Despite the high rate of steel production the steelmakers appear to be making little headway against orders backlogs. Indications are tonnage carryover into first quarter of next year will be substantial, and despite the uncertainty in business circles as reflected in the weak stock market since the election, there is no sign of noticeable easing in steel demand for months to come. An increasing amount of steel is moving into the defense program.

QUOTAS— Uncertainty as to what lies ahead with respect to certified programs is making for continued delay in the setting up of consumer quotas for the first quarter of next year. Confronting steelmakers is the question not only as to the extension of voluntary allocations beyond February, but also as to what government policy will be on mandatory allocations after the 81st Congress convenes. Most observers doubt mandatory controls will be applied short of a war crisis. It is felt, however, standby mandatory powers may be granted the President to implement voluntary allocations.

PRICES— Except for an adjustment on stainless-clad plates by two producers, and an increase in the price of rails by one producer, the market last week was devoid of price changes. For the most part it now is believed current price schedules in the main will hold steady. However, adjustments both in extra cards and base prices are likely to be made by individual producers to reflect cost positions. In the case of the rail advance last week the producer stated it had sold its product for several years without profit. In view of President Truman's position on prices it is likely the steelmakers will move cautiously in effecting further advances. It can be accepted they will do everything possible to discourage government price fixing.

COMPOSITES— STEEL'S arithmetical price composites held unchanged last week and compared with those for the like week a year ago as follows: Finished steel, $95.05 and $76.09; semifinished steel, $75.75 and $57.20; steelmaking pig iron, $46.29 and $36.41; and steelmaking scrap, $43.25 and $40.42.

STEELWORKS OPERATIONS



DISTRICT STEEL RATES

Percentage of Ingot Capacity engaged in Leading Districts

	Week Ended Nov. 13	Change	Same Week 1947	Same Week 1946
Pittsburgh	97	+ 1.5	102	98
Chicago	99	None	95	92.5
Eastern Pa.	95	None	93.5	77
Youngstown	105	None	91	91
Wheeling	92.5	+ 1.5	93.5	89
Cleveland	96.5	— 3	95.5	89
Buffalo	104	None	88.5	88.5
Birmingham	100	None	99	99
New England	90	None	87	90
Cincinnati	103	— 3	91	89
St. Louis	82.5	— 7	77.5	68
Detroit	99	— 1	92	92
Estimated national rate	99	None	97	91.5

Based on weekly steelmaking capacity of 1,802,476 net tons for 1948; 1,749,928 tons for 1947; 1,762,381 tons for 1946.

COMPOSITE MARKET AVERAGES

Arithmetical Price Composites*

	Nov. 13	Nov. 6	Month Ago Oct. 1948	Year Ago Nov. 1947	5 Years Ago Nov. 1943
Finished Steel	$95.05	$95.05	$95.05	$76.09	$56.73
Semifinished Steel	75.75	75.75	75.75	57.20	36.00
Steelmaking Pig Iron	46.29	46.29	46.19	36.38	23.00
Steelmaking Scrap	43.25	43.25	43.25	40.42	19.17

FINISHED STEEL WEIGHTED COMPOSITE†

Oct. 1948	4.14340c
Sept. 1948	4.13446c
Aug. 1948	4.14340c
Oct. 1947	3.45536c
Oct. 1943	2.40831c

***STRAIGHT ARITHMETICAL COMPOSITES:** Computed from average industry-wide mill prices on Finished Carbon Steel (hot-rolled sheets, cold-rolled sheets, cold-rolled strip, hot-rolled bars, plates, structural shapes, basic wire, standard nails, tin plate, standard and line pipe), on Semifinished Carbon Steel (rerolling billets and slabs, sheet bars, skelp, and wire rods), on Basic Pig Iron (at eight leading producing points), and on Steelworks Scrap (No. 1 melting grade at Pittsburgh, Chicago and eastern Pennsylvania). Steel arithmetical composites, dollars per net ton; pig iron and scrap, gross ton.

†**FINISHED STEEL WEIGHTED COMPOSITE:** Computed in cents per pound, mill prices, weighted by actual monthly shipments of following products, representing about 82 per cent of steel shipments in the latest month for which statistics are available, as reported by American Iron & Steel Institute: Structural shapes; plates, standard rails; hot and cold-finished carbon bars; black butt weld pipe and tubes; black lap weld pipe and tubes; black electric weld pipe and tubes; black seamless pipe and tubes; drawn wire; nails and staples; tin and terne plate; hot-rolled sheets; cold-rolled sheets; galvanized sheets; hot-rolled strip; and cold-rolled strip. October, 1948, figure is preliminary.

COMPARISON OF PRICES

Representative market figures for current week; average for last month, three months and one year ago. Finished material (except tin plate) and wire rods, cents per lb; semifinished (except wire rods) and coke, dollars per net ton, others dollars per gross ton. Delivered prices represent lowest from mills.

Finished Materials

	Nov. 13, 1948	Oct. 1948	Aug. 1948	Nov. 1947
Steel bars, Pittsburgh mills	3.45c	3.45c	3.45c	2.90c
Steel bars, del. Philadelphia	3.79	3.79	3.79	3.318
Steel bars, Chicago mills	3.35	3.35	3.35	2.90
Shapes, Pittsburgh mills	3.275	3.275	3.275	2.80
Shapes, Chicago mills	3.25	3.25	3.25	2.80
Shapes, del. Philadelphia	3.48	3.48	3.48	2.954
Plates, Pittsburgh mills	3.50	3.50	3.50	2.95
Plates, Chicago mills	3.40	3.40	3.40	2.95
Plates, del. Philadelphia	3.71	3.71	3.71	3.17
Sheets, hot-rolled, Pittsburgh mills	3.275	3.275	3.275	2.80
Sheets, cold-rolled, Pittsburgh	4.00	4.00	4.00	3.55
Sheets, No. 10 galv., Pittsburgh	4.40	4.40	4.40	3.90
Sheets, hot-rolled, Gary mills	3.25	3.25	3.25	2.80
Sheets, cold-rolled, Gary mills	4.00	4.00	4.00	3.55
Sheets, No. 10 galv., Gary mills	4.40	4.40	4.40	3.90
Strip, hot-rolled, Pittsburgh mills	3.275	3.275	3.275	2.80
Strip, cold-rolled, Pittsburgh mills	4.375	4.375	4.375	3.55
Bright basic, wire, Pittsburgh	4.325	4.325	4.325	3.675
Wire nails, Pittsburgh mills	5.775	5.775	5.775	4.625
Tin plate, per base box, Pitts. dist.	$6.70	$6.80	$6.80	$5.75

Semifinished

Sheet bars, mill	$67.00*	$67.00*	$67.00*	$53.57
Slabs, Chicago	52.00	52.00	52.00	40.18
Rerolling billets, Pittsburgh	59.00	59.00	59.00	40.18
Wire rod $\frac{7}{32}$ to $\frac{1}{4}$-inch, Pitts. dist.	3.775c	3.775c	3.775c	3.05c

* Nominal.

Pig Iron

	Nov. 13, 1948	Oct. 1948	Aug. 1948	Nov. 1947
Bessemer, del. Pittsburgh (N.&S. sides)	$48.08	$48.08	$48.08	$37.913
Basic, Valley	46.00	46.00	43.00	36.00
Basic, eastern del. Philadelphia	50.17	50.17	46.17	38.84
No. 2 fdry., del. Pgh. (N.&S. sides)	47.58	47.58	47.58	37.413
No. 2 fdry., del. Philadelphia	50.67	50.67	46.67	39.34
No. 2 foundry, Chicago	46.25	45.13	43.25	36.00
No. 2 foundry, Valley	46.50	43.50	43.50	36.50
Southern No. 2 Birmingham	43.38	43.38	43.38	34.88
Southern No. 2 del. Cincinnati	49.09	49.09	49.09	38.544
Malleable, Valley	46.50	46.50	43.50	36.50
Malleable, Chicago	46.50	45.38	43.50	36.50
Charcoal, low phos., fob Lyles, Tenn.	66.00	66.00	62.00	46.40
Ferromanganese, fob Aetna, Pa.	163.00	163.00	148.00*	151.00*

* F.o.b. cars Pittsburgh.

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$42.75	$42.75	$42.75	$40.00
Heavy melt. steel, No. 2, E. Pa.	41.50	41.50	41.50	42.40
Heavy melt. steel, No. 1, Chicago	41.75	41.75	41.75	38.75
Heavy melt. steel, No. 1, Valley	42.75	42.75	42.75	39.875
Heavy melt. steel, No. 1, Cleveland	42.25	42.25	42.25	39.625
Heavy melt. steel, No. 1, Buffalo	48.50	48.15	46.56	41.81
Rails for rerolling, Chicago	68.50	65.50	64.13	56.25
No. 1 cast, Chicago	70.50	70.75	70.75	49.00

Coke

Connellsville, beehive furnace	$14.50	$14.50	$14.38	$12.25
Connellsville, beehive foundry	17.00	17.00	17.00	14.50
Chicago, oven foundry, ovens	20.40	20.40	20.40	17.50

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per net ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, open market, $100-$105 per gross ton. Forging quality $50 per net ton, mill.

Alloy Steel Ingots: $51 per net ton, mill.

Rerolling Billets, Blooms, Slabs: $52 per net ton, mill, except $62, Conshohocken, Pa.; $66, Monessen, Pa.; sales by smaller interests on negotiated basis at $85 per gross ton, or higher.

Forging Quality Billets, Blooms, Slabs: $61 per net ton, mill, except: $68, Conshohocken, Pa., mill.

Alloy Billets, Slabs, Blooms: Rerolling quality, $63 per net ton, mill, except: $70, Conshohocken, Pa.

Sheet Bars: $67 nom., per net ton, mill; sales in open market $110-$115 per gross ton.

Skelp: 3.25c per lb, mill.

Tube Rounds: $76 per net ton, mill; some sellers quoting up to $120 per gross ton.

Wire Rods: Basic and acid open-hearth, 7/32 & $\frac{9}{32}$-inch, inclusive, 3.40c per lb, mill, except: 3.65c, Struthers, O.; 3.70c, Worcester, Mass.; 4.05c, Pittsburg, Calif.; 4.10c, Portsmouth, O., Los Angeles; 4.15c, Monessen, Pa. One producer quotes 3.90c, Chicago base. Basic open-hearth and bessemer, not resulphurized, 7/32 to 47/64-inch, inclusive, 3.50c, mill.

Bars

Hot-Rolled Carbon Bars (O.H. only) and Bar-Size Shapes under 3-in. (Base 20 tons one size): 3.35c, mill, except: 3.55c, Ecorse, Mich., Pittsburgh, Monessen, Aliquippa, Pa.; 4.05c, Pittsburg, Torrance, Calif.; 4.10c, S. San Francisco, Los Angeles, Niles, Calif., Portland, Oreg., Atlanta, Seattle; 4.20c, Kansas City, Mo.; 4.25c, Minnequa, Colo.; 5.30c, Fontana, Calif.

Rail Steel Bars: (Base 10 tons): 3.35c, Moline, Ill.; 4.80c, Williamsport, Avis, Pa.; another interest quotes 5.35c, mill.

Hot-Rolled Alloy Bars: 3.75c, mill, except: 4.05c, Ecorse, Mich.; 4.80c, Los Angeles; 5.50c, Fontana, Calif.

Hot-Rolled Alloy Bar Shapes: 4.00c, mill.

Cold-Finished Carbon Bars (Base 20,000-39,999 lb): 4.00c, mill, except: 3.95c, Pittsburgh, Cumberland, Md.; 4.20c, Indianapolis; 4.25c, Monessen, Pa.; 4.30c, Ecorse, Mich.; 4.35c, St. Louis; 4.36c, Plymouth, Mich.; 4.40c, Newark, N. J., Hartford, Putnam, Conn., Mansfield, Readville, Mass.; 4.45c, Camden, N. J.; 5.30c, Los Angeles.

Cold-Finished Alloy Bars: 4.65c, mill, except: 4.75c, Monessen, Pa.; 4.85c, Indianapolis; 4.95c, Worcester, Mansfield, Mass., Hartford.

High-Strength, Low-Alloy Bars: 5.10c, mill, except: 5.40c, Ecorse, Mich.

Reinforcing Bars (New Billet): 3.35c, mill, except: 3.55c, Monessen, Pa.; 4.05c, Pittsburg, Torrance, Calif.; 4.10c, Atlanta, Seattle, S. San Francisco, Los Angeles; 4.25c, Minnequa, Colo. Fabricated: To consumers: 4.25c, mill, except: 5.00c, Seattle.

Reinforcing Bars (Rail Steel): 4.65c, Williamsport, Pa., mill; another interest quotes 5.35c, mill.

Wrought Iron Bars: Single Refined: 8.60c, (hand puddled), McKees Rocks, Pa.; 9.50c, Economy, Pa. Double Refined: 11.25c (hand puddled), McKees Rocks, Pa., 11.00c, Economy, Pa. Staybolt: 12.75c, (hand puddled), McKees Rocks, Pa.; 11.30c, Economy, Pa.

Sheets

Hot-Rolled Sheets (18 gage and heavier): 3.25c, mill, except: 3.25-3.30c, Cleveland; 3.30c, Pittsburgh; 3.45c, Ecorse, Mich.; 3.95c, Pittsburgh, Torrance, Calif.; 5.00c, Conshohocken, Pa.; 5.65c, Fontana, Calif.; 6.25c, Kansas City, Mo.

Hot-Rolled Sheets (19 gage and lighter, annealed): 4.15c, mill, except: 4.40c, Alabama City, Ala.; 4.65c, Niles, O., 5.05c, Torrance, Calif., Kokomo, Ind.

Cold-Rolled Sheets: 4.00c, mill, except: 4.20c, Granite City, Ill., Ecorse, Mich.; 4.95c, Pittsburg, Calif.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) 4.40c, mill, except: 5.00c, Niles, O.; 5.15c, Pittsburg, Torrance, Calif.; 5.30c, Kokomo, Ind.

Galvannealed Sheets: 4.95c, mill, except: 5.05c, Indiana Harbor, Ind.; 5.55c, Niles, O.; 5.70c, Kokomo, Ind.

Culvert Sheets, No. 16 flat Copper Steel (based on 5-cent zinc): 5.00c, mill, except: 5.40c, Granite City, Ill.; 5.45c, Kokomo, Ind.; 5.75c, Pittsburg, Torrance, Calif.

Long Ternes, No. 10 (Commercial quality): 4.80c, mill.

Enameling Sheets, No. 12: 4.40c, mill, except: 4.60c, Granite City, Ill.; 4.70c, Ecorse, Mich.; 6.00c, Niles, O.

Silicon Sheets, No. 24: Field: 5.15c, mill. Armature: 5.45c, mill, except: 5.95c, Warren, O.; 6.05c, Niles, O.

Electrical: Hot-rolled, 5.95c, mill, except: 6.05c, Kokomo, Ind.; 6.15c, Granite City, Ill.; 6.45c, Warren, O.; 6.55c, Niles, O.

Motor: 6.70c, mill except: 6.90c, Granite City, Ill.; 7.20c, Warren, O.; 7.95c, Follansbee, W. Va., Toronto, O.; 9.20c, Brackenridge, Pa.

Dynamo: 7.50c, mill, except: 8.65c, Follansbee, W. Va., Toronto, O.; 7.70c, Granite City, Ill.; 10.00c, Brackenridge, Pa.

Transformer 72, 8.05c, mill, except; 9.15c, Follansbee, W. Va., Toronto, O.; 11.80c, Brackenridge, Pa. 65, 8.60c, mill, except: 9.85c, Follansbee, W. Va., Toronto, O.; 12.35c, Brackenridge, Pa.; 58, 9.30c, mill, except: 10.55c, Follansbee, W. Va., Toronto, O.; 13.05c, Brackenridge, Pa.; 52, 10.10c, mill, except: 11.35c, Follansbee, W. Va., Toronto, O.

High-Strength Low-Alloy Sheets: Hot-rolled, 4.95c, mill, except: 5.25c, Ecorse, Mich., and Conshohocken, Pa., mills.

Galvanized (No. 10), 6.75c, mill.

Cold-rolled, 6.05c, mill, except: 6.35c, Ecorse, Mich.

Strip

Hot Rolled Strip: 3.25c mill, except: 3.30c, Cleveland, Pittsburgh, Riverdale, Ill.; 3.25-3.35c,* Sharon, Pa.; 3.45c, Ecorse, Mich., Atlanta; 3.60c, Detroit; 3.70c, West Leechburg, Pa.; 4.00c, Pittsburg, Torrance, Calif.; 4.25c, Seattle, S. San Francisco, Los Angeles; 4.20c, Kansas City, Mo.; 4.30c, Minnequa, Colo.; 5.90c, Fontana, Calif. One company quotes 4.90c, Pittsburgh base.

* Wider than 6-in. and 6-in. and narrower, respectively.

Cold-Rolled Strip (0.25 carbon and less): 4.00c, mill, except 4.00-4.25c, Warren, O.; 4.00-4.50c, Youngstown; 4.20c, Ecorse, Mich.; 4.25c, Riverdale, Ill.; 4.40-4.50c, Detroit; 4.50c, New Haven, Conn., West Leechburg, New Castle, Pa., Boston; 4.75c, Dover, O., New Kensington, Pa.; 4.50-5.00c, Trenton, N. J.; 4.80-5.05c, Wallingford, Conn.; 5.75c, Los Angeles; 7.10c, Fontana, Calif. One company quotes 4.55c, Cleveland or Pittsburgh base, and 4.75c, Worcester, Mass., base; another, 5.00c, Pittsburgh base.

Cold-Rolled Alloy Strip: 9.50c, mill, except: 9.80c, Worcester, Mass.

High-Strength, Low-Alloy Strip: Hot-rolled, 4.95c, mill, except: 5.25c, Ecorse, Mich., mill. Cold-rolled, 6.05c, mill, except: 6.35c, Ecorse, Mich., mill.

Tin, Terne Plate

Tin Plate: American Coke, per base box of 100 lb, 1.25 lb coating $6.60-$6.80; 1.50 lb coating $6.80-$7.00. Pittsburg, Calif., mill $7.35 and $7.55, respectively, for 1.25 and 1.50 lb coatings.

Electrolytic Tin Plate: Per base box of 100 lb, 0.25 lb tin, $5.80-$6.00; 0.50 lb tin, $6.00-$6.20; 0.75 lb tin, $6.20-$6.40.

Can Making Black Plate: Per base box of 100 lb, 55 to 70 lb basis weight, $5.20-$5.30; 75 to 95 lb basis weight $5.10-$5.20; 100 to 128 lb basis weight, $5.20-$5.30. $5.95, $5.85, $5.95, respectively, Pittsburg, Calif.

Holloware Enameling Black Plate: 29-gage, 4.75c per pound, except: 4.85c, Sparrows Point, Md.; 4.95c, Granite City, Ill.

Manufacturing Ternes (Special Coated): Per base box of 100 lb, $5.90, except: $6 Fairfield, Ala., Sparrows Point, Md.

Roofing Ternes: Per package 112 sheets; 20 x 28 in., coating I.C. 8-lb, $15.50.

Plates

Carbon Steel Plates: 3.40c, mill, except: 3.40-3.60c, Cleveland; 3.45c, Sparrows Point, Md., Johnstown, Pa., Lackawanna, N. Y.; 3.60c, Pittsburgh; 3.65c, Ecorse, Mich.; 3.75c., Coatesville, Pa.; 3.95c, Claymont, Del., Conshohocken, Pa.; 4.30c, Seattle, Minnequa, Colo.; 4.56c, Houston, Tex.; 5.80c, Fontana, Calif.; 6.50c, Harrisburg, Pa.; 6.25c, Kansas City, Mo.

Floor Plates: 4.55c, mill.

Open-Hearth Alloy Plates: 4.40c, mill, except: 5.10c, Coatesville, Pa., mill.

High-Strength, Low-Alloy Plates: 5.20c mill, except: 5.10c, Coatesville, Pa.; 5.30c, Conshohocken, Pa., Sparrows Point, Md., Johnstown, Pa.; 5.65c, Ecorse, Mich., Sharon, Pa.

Shapes

Structural Shapes: 3.25c, mill, except: 3.30c, Bethlehem, Pa., Lackawanna, N. Y., Johnstown, Aliquippa, Pa.; 3.85c, Torrance, Calif.; 4.15c, Minnequa, Colo.; 4.30c, Seattle, S. San Francisco, Los Angeles; 5.75c, Fontana, Calif.

Alloy Structural Shapes: 4.05c, mill.

Steel Sheet Piling: 4.05c, mill.

High-Strength, Low-Alloy Shapes: 4.95c, mill, except: 5.05c, Bethlehem, Johnstown, Pa., Lackawanna, N. Y.

Wire and Wire Products

Wire to Manufacturers (carloads): Bright, Basic or Bessemer Wire, 4.15c, mill, except: 4.00c, Atlanta; 4.25c, Sparrows Point, Md., Kokomo, Ind.; 4.45c, Worcester, Mass.; 4.50c, Monessen, Pa., Minnequa, Colo., Buffalo; 4.70c, Portsmouth, O.; 4.80c, Palmer, Mass.; 5.10c, Pittsburg, Calif.; 5.15c, S. San Francisco; 5.40c, Shelton, Conn. One producer quotes 4.50c, Chicago base; another, 4.50c, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Basic MB Spring Wire, 5.55c, mill, except: 5.30c, Portsmouth, O.; 5.65c, Sparrows Point, Md., Monessen, Pa.; 5.85c, Worcester, Palmer, Mass., Trenton, N. J.; 6.50c, Pittsburg, Calif.

Upholstery Spring Wire, 5.20c mill, except: 5.30c, Sparrows Point, Md., Williamsport, Pa.; 5.50c, Worcester, Mass., Trenton, N. J., New Haven, Conn.; 6.15c, Pittsburg, Calif.

Wire Products to Trade (carloads): Merchant Quality Wire: Annealed (6 to 8 Gage base), 4.80c, mill, except: 4.90c, Sparrows Point, Md.; 4.95c, Monessen, Pa.; 5.10c, Worcester, Mass.; 5.15c, Minnequa, Colo., Kokomo, Ind.; 5.20c, Atlanta; 5.75c, S. San Francisco, Pittsburg, Calif. One producer quotes 5.15c, Chicago and Pittsburgh base; another, 5.20c. Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Galvanized (6 to 8 Gage base), 5.25c, mill, except: 5.35c, Sparrows Point, Md.; 5.40c, Monessen, Pa.; 5.55c, Worcester, Mass.; 5.60c, Kokomo, Ind., Minnequa, Colo.; 5.65c, Atlanta; 6.20c, Pittsburg, S. San Francisco, Calif. One producer quotes 5.60c, Pittsburgh and Chicago base; another, 5.65c, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Nails and Staples: Standard, cement-coated and galvanized nails and polished and galvanized staples, Column 103, mill, except: 105, Sparrows Point, Md., Kokomo, Ind.; 109 Worcester, Mass.; 110 Minnequa, Colo., Atlanta; 117, Portsmouth, O.; 123, Pittsburg, Calif.; 124, Cleveland; 126, Monessen, Pa.; $6.75 per 100 pound keg, Conshohocken, Pa., Wheeling, W. Va. One producer quotes column 109, Chicago and Pittsburgh base; another, column 113, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Woven Fence (9 to 15½ Gage, inclusive): Column 109, mill, except: 113, Monessen, Pa., Kokomo, Ind.; 116, Minnequa, Colo.; 121 Atlanta; 132, Pittsburg, Calif. One producer quotes column 113, Pittsburgh and Chicago base; another, column 114, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Barbed Wire: Column 123 mill, except: 125, Sparrows Point, Md., Kokomo, Ind.; 126, Atlanta; 128, Monessen, Pa.; 130, Minnequa, Colo.; 143, Pittsburg, Calif.; 145, S. San Francisco. One producer quotes 127, Chicago and Pittsburgh base.

Fence Posts (with clamps): Column 114, Duluth; 115, Johnstown, Pa.; 116, Moline, Ill.; 122, Minnequa, Colo.; $123.50 per net ton, Williamsport, Pa.

Bale Ties (single loop): Column 106, mill, except: 108, Sparrows Point, Md., Kokomo, Ind.; 110, Atlanta; 113 Minnequa, Colo.; 130, S. San Francisco, Pittsburg, Calif. One producer quotes column 115, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Tubular Goods

Standard Steel Pipe: Mill prices in carlots, threaded and coupled, to consumers about $200 a net ton.

In.	Butt Weld Blk.	Butt Weld Gal.	In.	Butt Weld Blk.	Butt Weld Gal.
⅛	39½– 41½	10– 12½	1	46– 48½	27– 29½
¼	37½– 39½	11½– 14	1¼ ...	46½– 49	27½– 30
⅜	34– 36	6½– 9	1½ ...	47– 49½	28– 30½
½	40½– 43	20– 22½	2	47½– 50	28½– 31
¾	43½– 46	24– 26½	2½, 3..	48– 50½	29– 31½
			3½ & 4	44½	27½

In.	Lap Weld Blk.	Lap Weld Gal.	Elec. Weld Blk.	Elec. Weld Gal.	Seamless Blk.	Seamless Gal.
2	39½	19½	38½	18½	27– 38½	7– 19
2½ ..	42½– 43½	22½– 23½	41½	21½	32½– 41½	12½– 22
3	42½– 43½	22½– 24	41½	21½	35– 41½	15– 22
3½ & 4	42½– 46½	22½– 26½	43½	23½	38½– 43½	18½– 24
5 & 6	42½– 44½	22½– 24½	43½	23½	38½– 43½	18½ 24
7	....	....	....	....	43½	22½

Line Steel Pipe: Mill prices in carlots to consumers about $200 a net ton.

In.	Butt Weld Blk.	Butt Weld Gal.	In.	Butt Weld Blk.	Butt Weld Gal.
⅛	40½	....	1¼ ...	46– 48	28– 29
¼	38½	....			
⅜	35	....	1½ ...	46½– 48½	28½– 29½
½	40– 42	20½– 21½	2	47– 49	28½– 30
¾	43– 45	24½– 25½	2½ & 3	47½– 49½	29– 30½
1	45½– 47½	27½– 28½	3½ & 4	43½	....

In.	Lap Weld Blk.	Lap Weld Gal.	Elec. Weld Blk.	Elec. Weld Gal.	Seamless Blk.	Seamless Gal.
2	38½	18½	37½	17½	26– 37½	6– 18
2½ ..	41½– 42½	22½	40½	20½	31½– 40½	11½– 21
3	41½– 42½	22½	40½	20½	34– 40½	14– 21
3½-4.	41½– 45½	22– 25½	42½	22½	37½– 42½	17½– 23
5 & 6	41½– 43½	22	42½	22½	37½– 42½	17½– 23
8	45½	..	44½	23½– 24	40½– 44½	19½– 24
10 ...	45	..	44	23– 23½	41½– 44	20½– 23½
12 ...	44	..	43	22	40½– 43	19½– 22½

Standard Wrought Iron Pipe: Mill price in carlots, threaded and coupled, to consumers about $200 a net ton.

In.	Butt Weld Bulk	Butt Weld Gal.	In.	Lap Weld Bulk	Lap Weld Gal.
⅜ ...	+59½	+93	1¼ ..	+22	+50½
½ ...	+20½	+50	1½ ..	+15½	+43
¾ ...	+10½	+39	2 ...,	+ 7½	+34
1 and 1¼	+ 4½	+30	2½-3½	+ 5	+29½
1½ ..	— 1½	+26½	4	List	+23½
2	— 2	+26	4½-8	+ 2	+25
			9-12.	+12	+34½

Boiler Tubes: Net base c.l. prices, dollars per 100′, mill; minimum wall thickness, cut lengths 4 to 24″; inclusive.

O.D. In.	B.W. Ga.	Seamless Hot Rolled	Seamless Cold Drawn	Elec. Weld Hot Rolled	Elec. Weld Cold Drawn
1	13	....	13.39	13.00	13.00
1¼	13	....	15.87	13.21	15.39
1½	13	$15.05	17.71	14.60	17.18
1¾	13	17.11	20.15	16.60	19.54
2	13	19.18	22.56	18.60	21.89
2¼	13	21.37	25.16	20.73	24.40
2½	12	23.54	27.70	22.83	26.88
2¾	12	25.79	30.33	25.02	29.41
2¾	12	27.33	32.14	26.51	31.18
3	12	28.68	33.76	27.82	32.74
3¼	11	33.39	39.29	32.39	38.11
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78
4½	9	58.99	69.42	....	....
5	9	68.28	80.35	....	....
6	7	104.82	123.33	....	....

Rails, Supplies

Rails: Standard, over 60-lb; $3.20 per 100 lb, mill, except: $3.50, Indiana Harbor, Ind.

Light (billet): $3.55 per 100 lb, mill, except: $4.25, Minnequa, Colo.

Light (rail steel): $4.70 per 100 lb, Williamsport, Pa.

Railroad Supplies: Track bolts, treated: $8.50 per 100 lb, mill. Untreated: $8.25, mill.

Tie Plates: 4.05c mill, except: 4.20c, Pittsburg, Calif.; 4.50c, Seattle.

Splice Bars: 4.25c, mill.

Standard Spikes: 5.35c, mill, except: 5.25c, Pittsburgh.

Axles: 5.20c, mill.

Bolts, Nuts

Prices to consumers, f.o.b. midwestern plants. Sellers reserve right to meet competitors' prices, if lower. Additional discounts on carriage and machine bolts, 5 for carloads; 15 for full containers, except tire and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	35 off
⅝ and ⅝ x 6-in. and shorter	37 off
¾-in. and larger x 6-in. and shorter	34 off
All diameters longer than 6-in.	30 off
Tire bolts	25 off
Plow bolts	47 off
Lag bolts, 6 in. and shorter	37 off
Lag bolts, longer than 6 in.	35 off

Stove Bolts

In packages, nuts separate, 58½-10 off; bulk 70 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
7/16-in. and smaller	41 off	.....
½-in. and smaller	.....	38 off
½-in.-1-in.	39 off	.....
⅝-in.-1-in.	.....	37 off
1⅛-in.-1½-in.	37 off	35 off
1⅝-in. and larger	34 off	28 off

Additional discount of 15 for full containers.

Hexagon Cap Screws (Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright)	46 off
Upset (1035 heat treated)	
⅝ and smaller x 6 and shorter	40 off
¾, ⅞, & 1 x 6 and shorter	35 off

Square Head Set Screws

Upset 1-in. and smaller	51 off
Headless, ¼-in. and larger	31 off

Rivets

F.o.b. midwestern plants

Structural ½-in. and larger	6.75c
7/16-in. and under	48 off

Washers, Wrought

Fob shipping point, to jobbers...Net to $1 off

Tool Steels

Tool Steel: Cents per pound, producing plants; reg. carbon 19.00c; extra carbon 22.00c; special carbon 26.50c; oil-hardening 29.00c; high carbon-chromium 52.00c; chrome hot work, 29.00c.

W	Cr	V	Mo	Co	Base Per lb
18	4	1	...	...	90.50c
18	4	2	...	...	102.50c
18	4	3	...	...	114.50c
18	4	2	...	9	168.50c
1.5	4	1	8.5	...	65.00c
6.4	4.5	1.9	5	...	69.50c
6	4	3	6	...	88.00c

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Pig Iron

Per Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., furnace	$48.00	$48.50	$49.00	$49.50
Newark, N. J., del.	50.39	50.89	51.39	51.89
Brooklyn, N. Y., del.	....	52.40	52.90	....
Philadelphia, del.	50.17	50.67	51.17	51.67
Birmingham, furnace	42.88	43.38	....	....
Cincinnati, del.	....	49.09	....	....
Buffalo, furnace	*47.00	*47.00	*47.50	48.00
Boston, del.	55.42	55.42	55.92	....
Rochester, del.	49.22	49.22	49.72	50.22
Syracuse, del.	50.025	50.025	50.525	41.025
§**Chicago,** district furnaces	46.00	46.00-46.50	46.50	47.00
Milwaukee, del.	47.72	47.72-48.22	48.22	48.72
Muskegon, Mich., del.	....	50.98-51.48	51.48	....
Cleveland, furnace	46.00	46.50	46.50	47.00
Akron, del.	48.17	48.67	48.67	49.17
Lone Star, Tex., furnace	....	†75.00	....	....
Duluth, furnace	....	46.00	46.50	47.00
Erie, Pa., furnace	45.50	46.00	46.50	47.00
Everett, Mass., furnace	....	48.75	49.25	....
Geneva, Utah, furnace	46.00	46.50	....	....
Seattle, Tacoma, Wash., del.	....	53.63	....	....
Portland, Oreg., del.	....	53.63	....	....
Los Angeles, San Francisco.	53.13	53.63	....	....
Granite City, Ill., furnace	47.90	48.40	48.90	....
St. Louis, del.	48.65	49.15	49.65	....
Ironton, Utah, furnace	....	46.50	....	....
‡**Neville Island, Pa.,** furnace.	46.00	46.50	46.50	47.00
Pittsburgh, del., N.&S. Sides	47.08	47.58	47.58	48.08
Pittsburgh (Carnegie), furnaces	46.00	....	....	47.00
Sharpsville, Pa., furnace	46.00	46.50	46.50	47.00
Steelton, Pa., furnace	48.00	48.50	49.00	49.50
Struthers, O., furnace	42.50	....	....	....
Swedeland, Pa., furnace	50.00	50.50	51.00	....
Toledo, O., furnace	45.50	46.00	46.50	47.00
Cincinnati, del.	50.05	50.55	....	....
Youngstown, O., furnace	46.00	46.50	46.50	47.00
Mansfield, O., del.	49.87	50.37	50.37	50.87

* Republic Steel Corp. quotes $1 a ton higher for basic, No. 2 foundry and malleable at Buffalo.

† Low phosphorus southern grade.

‡ To Neville Island base add: $0.86 for McKees Rocks, Pa.; $1.31 Lawrenceville, Homestead, McKeesport, Monaco; $1.73 Verona; $1.94 Brackenridge; $1.08 for Ambridge and Aliquippa.

§ Includes, in addition to Chicago, South Chicago, Ill., East Chicago, Gary and Indiana Harbor, Ind.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent Si (base)	$59.50		
6.51-7.00	60.75	9.01- 9.50	67.00
7.01-7.50	62.00	9.51-10.00	68.25
7.51-8.00	63.25	10.01-10.50	69.50
8.01-8.50	64.50	10.51-11.00	70.75
8.51-9.00	65.75	11.01-11.50	72.00

F.o.b. Jackson, O., per gross ton. Buffalo furnace $1.25 higher.

Bessemer Ferrosilicon

Prices same as for blast furnace silvery iron, plus $1 per gross ton.

Electric Furnace Silvery Pig Iron Si 14.01-14.50%, $84.75 furnace, Niagara Falls; $84 open-hearth anu $85 foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. F.o.b. furnace, Lyles, Tenn. ..$66 (For higher silicon iron a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Low Phosphorus

Steelton, Pa., $54; Buffalo, Troy, N. Y., $50. Philadelphia, $56.81 delivered.

Intermediate phosphorus, Central furnace, Cleveland, $51.

Differentials

Prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Fluorspar

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more $37; less than 60% $34.

Metallurgical Coke

Price per Net Ton

Beehive Ovens

Connellsville, furnace	$13.50-15.50
Connellsville, foundry	16.00-18.00
New River, foundry	16.50
Wise county, foundry	15.35
Wise county, furnace	14.60

Oven Foundry Coke

Kearney, N. J., ovens	$21.50
Chicago, ovens	20.40
Chicago, del.	†21.75
Detroit, del.	23.95
Terre Haute, ovens	21.00
Milwaukee, ovens	21.15
Indianapolis, ovens	20.85
Chicago, del.	24.00
Cincinnati, del.	21.40
Detroit, del.	24.40
Ironton, O., ovens	18.25
Painesville, O., ovens	20.90
Erie, del.	22.57
Cleveland, del.	22.46
Buffalo, del.	23.25
Philadelphia, ovens	20.55
Swedeland, Pa., ovens	20.50
Portsmouth, O., ovens	19.25
Detroit, ovens	20.65
Detroit, del.	*21.65
Flint, del.	22.85
Pontiac, del.	21.91
Saginaw, del.	23.15

Includes representative switching charge of: *, $1; †, $1.35.

Coal Chemicals

Spot, cents per gallon, ovens

(Price effective as of Aug. 5)

Pure benzol	20.00
Toluol, one degree	20.50-26.50
Toluol, two degrees	23.00-26.50
Industrial xylol	20.50-26.50

Per pound, ovens

Phenol, 40 (car lots, returnable drums)	13.00
Do., less than carlots	13.75
Do., tank cars	12.00
Naphthalene flakes, balls, bbl to jobbers, "household use"	12.00

Per ton, bulk, ovens

Sulphate of ammonia	$45.00

Refractories

(Prices per 1000 brick, f.o.b. plant)

Fire Clay Brick

Super Duty: St. Louis, Vandalia, or Farber, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., $100.

High-Heat Duty: Salina, Pa., $85; Woodbridge, N. J., St. Louis, Farber, or Vandalia, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., $80.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, Haldeman, or Athens, Ky., Troup, Tex., Stevens Pottery, Ga., or Portsmouth, O., $74.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Pa., Bessemer, Ala., $66.

Ladle Brick

Dry Press: $55, Freeport, Merill Station, Clearfield, Pa.; Chester, New Cumberland, W. Va.; Irondale, Wellsville, O.

Wire Cut: $53, Chester, New Cumberland, W. Va.; Wellsville, O.

Malleable Bung Brick

St. Louis, Mo., Olive Hill, Ky., $83; Beach Creek, Pa., $73.

Silica Brick

Mt. Union, Claysburg, or Sproul, Pa., Ensley, Ala., $80; Hays, Pa. $85; Joliet or Rockdale, Ill., $89; Lehi, Utah, Los Angeles, $95.

Eastern Silica Coke Oven Shapes: Claysburg, Mt. Union, Sproul, Pa., $80.

Illinois Silica Coke Oven Shapes: Joliet or Rockdale, Ill., $81.

Basic Brick

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Chrome brick or chemical-bonded chrome brick, $69, magnesite brick, $91; chemical-bonded magnesite, $80.

Magnesite

(Base prices per net ton, f.o.b. works, Chewelah, Wash.)

Domestic dead-burned, ⅜" grains: Bulk, $31; single paper bags, $35.50.

Dolomite

(Base prices per net ton)

Domestic, dead-burned bulk: Billmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibonsburg, Woodville, O., $11.85; Thornton, McCook, Ill., $11.95; Dolly Sliding, Bonne Terre, Mo., $12.05.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural) Lower Lake Ports

(Any increase or decrease in R. R freight rates, dock handling charges and taxes thereon effective after Apr. 1, 1948, are for buyer's account.)

Old range bessemer	$6.60
Old range nonbessemer	6.45
Mesabi bessemer	6.35
Mesabi nonbessemer	6.20
High phosphorus	6.20

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56.62% contract	15.25

Foreign Ore

Cents per unit, cif Atlantic ports

Swedish basic, 60 to 68%	14.50
Brazil iron ore, 68-69%	18.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$26-$28

Manganese Ore

48-50%, duty paid, f.o.b. cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 67.60c-72.60c.

Chrome Ore

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S.C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash. (S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$25.50-$26.00
45% no ratio	26.50
48% no ratio	29.00-30.00
50% no ratio	29.50-30.50
Brazilian—nominal	
44% to 2.5:1 lump	$33.65
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb., Mo., cont., Mines	$0.75

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

	SHEETS			STRIP		BARS				PLATES	
	H-R 10 Ga.	C-R 17 Ga.	Gal. *10 Ga.	†H-R	†C-R	H-R Rds. ⅜" to 3"	C-F Rds. ½" & up	H-R Alloy **4140	Standard Structural Shapes	Carbon ⅜"-¾"	Floor ⅜" & Thicker
Boston (city)	5.84	6.64	7.84	6.04	6.90	5.69	6.39	8.24-9.74	5.54	5.89	7.34
Boston (c'try)	5.69	6.49	7.69	5.89	6.75	5.54	6.24	8.09-9.59	5.39	5.74	7.19
New York (city)	5.73-5.80	6.73	7.74-7.83	6.08-6.28	...	5.83	6.58	8.22	5.52-5.78	5.98	7.48
New York(c'try)	5.53-5.60	6.53	7.54-7.63	5.88-6.08	...	5.63	6.38	...	5.32-5.58	5.78	7.28
Phila. (city)	5.50-5.86	6.61-6.81	7.42-7.62	5.46-5.81	...	5.57-5.65	6.31	8.39	5.24-5.40	5.52-5.65	6.73-7.16
Phila. (c'try)	5.35-5.71	6.46-6.66	7.27-7.47	5.31-5.66	...	5.42-5.50	6.16	8.24	5.09-5.25	5.37-5.50	6.58-7.01
Balt. (city)	5.43†	6.33	7.18	5.49	...	5.54	...	...	5.48	5.68	7.13
Balt. (c'try)	5.28†	6.18	7.03	5.34	...	5.39	...	...	5.33	5.53	6.98
Norfolk, Va.	5.75	...	...	...	...	6.00	7.00	...	6.00	6.00	7.50
Wash. (w'house)	5.81-5.97	...	...	5.87	...	5.88-5.92	6.58	...	5.82-5.86	6.02-6.06	7.47-7.51
Buffalo (del.)	5.20-5.25	5.95-6.00	7.75	5.70	6.50	5.35	6.05	9.50	5.25	5.60	7.70
Buff. (w'house)	5.05-5.10	5.80-5.85	7.60	5.55	6.35	5.20	5.90	9.40	5.10	5.45	7.55
Pitts. (w'house)	4.85-5.00‡	5.75-5.85[5]	7.00-7.05	5.00-5.35	5.95-6.00	4.90-5.10	5.65	7.65	4.90-5.15	5.05-5.25	6.55
Det. (w'house)	5.40-5.75‡	6.30-6.60	7.60	5.40-5.70	6.50	5.45	6.17	8.12	5.45	5.65-5.80	7.10
Cleveland (del.)	5.13-5.90‡‡	5.90-6.29	7.34-8.00‡‡	5.17-5.69	6.85	5.30-5.34	6.05-6.10	8.24-8.54	5.34-5.60	5.50-5.54	6.95-6.99
Cleve. (w'hse)	4.98-5.75	5.75-6.14	7.19-7.85	5.02-5.54	6.70	5.15-5.19	5.90-5.95	8.09-8.39	5.19-5.45	5.35-5.39	6.80-6.84
Cincin. (w'hse)	5.26	6.11	7.60	5.52	6.07	5.52	6.07	...	5.37	5.61	6.91
Chicago (city)	5.00-5.20	5.90‡[8]	7.20-7.25	5.00	6.64-6.80	5.05	5.85	8.25[9]	5.05	5.25	6.70
Chicago (w'hse)	4.85-5.05	5.75‡[8]	7.05-7.10	4.85	6.49-6.65	4.90	5.70	8.10[9]	4.90	5.10	6.55
Milwaukee (city)	5.37	6.07‡[8]	7.37-7.42	5.17	6.81-6.97	5.22	6.02	8.42[9]	5.22	5.42	6.87
St. Louis (del.)	5.34‡	6.24[8]	7.44	5.34	6.64	5.39	6.19[12]	6.64	5.39	5.59	7.04
St. L. (w'hse)	5.19‡	6.09[8]	7.29	5.19	6.49	5.24	6.04[12]	9.49	5.24	5.44	6.89
Birm'ham (city)	5.20‡	...	6.60	5.20	...	5.15	6.66	...	5.15	5.40	7.41-7.66
Birm'ham(c'try)	5.05‡	...	6.45	5.05	...	5.00	6.51	...	5.00	5.25	7.26-7.51
Omaha, Nebr.	6.07	...	9.33	6.07	...	6.12	6.92	...	6.12	6.32	7.77
Los Ang. (city)	6.55‡	8.05	8.20†	6.75	9.50	6.20	8.00-8.50	...	6.70	6.40	8.15
Los Angeles (w'house)	6.40‡	7.90	8.05†	6.60	9.35	6.05	7.85-8.35	...	6.55	6.25	8.00
San Francisco	5.95[21]	7.15	8.05	6.75[21]	8.25[18]	5.90[21]	7.55	10.20‡‡	5.90	7.60	8.10
Seattle-Tacoma	6.35[17]	7.90[6]	8.40	6.70[17]	...	6.20[17]	8.15[1]	9.45[2]	6.30[17]	6.35[17]	8.40[17]

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [3]—450 to 39,999 lb; [4]—three to 24 bundles; [5]—450 to 1499 lb; [6]—400 to 14,999 lb; [8]—400 to 1499 lb; [9]—1000 to 1999 lb; [11]—1000 to 39,999 lb; [12]—1000 lb and over; [18]—2000 lb and over; [17]—300 to 999 lb; [18]—1500 to 1999 lb; [19]—1500 to 39,999 lb; [20]—400 to 3999 lb; [21]—400 lb and over; [22]—500 to 1499 lb; [23]—Price (but not other price in range) applies to any and all quantities.

* Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; § 18 gage and heavier; ** as rolled; †† add 0.40 for sizes not rolled in Birmingham; ‡‡ top level of quoted range is nominal.

PRICES OF LEADING FERROALLOYS PRODUCTS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si) Carlot per gross ton, $57, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn.) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $160 per gross ton of alloy, c.l., packed, $172; gross ton lots, packed, $187; less gross ton lots, packed, $204; f.o.b. Alloy, W. Va., Niagara Falls, N. Y. ;or Welland, Ont. Base price; $165, Rockwood, Tenn.; $162, f.o.b. Birmingham and Johnstown, Pa., furnaces; $160, Sheridan, Pa.; $163, Aetna, Pa. Shipment from Pacific Coast warehouses on one seller add $31 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Ore. Shipment from Chicago warehouse, ton lots, $201; less gross ton lots, $218 fob Chicago. Add or subtract $2 for each 1%, or fraction thereof, of contained manganese over 82% and under 78%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 26.0c, ton lot 27.1c, less ton 28.3c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Carload, 2" x D, packed 35.5c per lb of metal, ton lot 37c, less ton 39c. Delivered. Spot, add 2c.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.6c per lb of alloy, carload packed, 9.35c, ton lot 10.25c, less ton 11.25c. Freight allowed. For 2% C grade, Si 15-17.5%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 20.5c per lb of contained Cr, c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., 8MxD, bulk 22.0c per lb. of contained Cr, c.l., packed 22.9c, ton lot 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.05% C 29.25c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, add C 1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lot 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Chromium Metal: (Mn 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max. 0.50% C grade, $1.03 per lb of contained chromium, ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

SILICON ALLOYS

20-30% Ferrosilicon: Contract, carload, lump, bulk, 16.50-17.50c per lb of contained Si; packed 18.90c; ton lots 20.00c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 10.5c per lb of contained Si, carload packed 12.1c, ton lot 13.55c, less ton 15.2c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.0c per lb of contained Si, carload packed 14.3c, ton lot 15.45c, less ton 16.7c. Delivered. Spot, add 0.3c.

80-90% Ferrosilicon: Contract, carload, lump, bulk 14.65-15c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.) Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Mn, 97% Si and 1% max. Fe.). C.l., lump, bulk, regular 19.0c per lb of Si c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. D., lump per lb cl 6.90c; ton lots packed, 7.40c; 200 to 1999 lb, 8.15c, smaller lots 8.65c; or, lump, carload, bulk, 8.40c per lb of alloy, packed c.l. 9.20c, ton lots 9.30c, 200 to 1000 lb 9.65c, less 200 lb 10.15c per lb of alloy. Delivered. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

(*Please turn to Page* 184)

Copper Supplies Tighten Further

Stockpiling plans of government coupled with shutdown of Kennecott's Utah properties cause concern among users. Undertone of market is strong

New York — Satisfactory progress is being made in negotiations between government officials and metal producers and importers in developing a program for the acquisition of copper, lead and zinc for the permanent stockpile. Industry representatives have announced their preference for dealing with the Munitions Board and the Bureau of Federal Supply on an individual contract basis rather than to follow the time-consuming procedure of the allocations program.

Copper — Shrinkage in copper supplies is causing consumers much concern because of the possibility of higher prices for the metal in the near future. Copper supply deficiencies have been aggravated by government stockpiling plans, which call for 90,000 tons before June 30, 1949, and by the strike which has closed Kennecott Copper Corp.'s Utah operations. Two large producers have adopted a policy of accepting orders only on the basis of prices prevailing on the date of shipment. Because of the price uncertainty with respect to copper, most large brass mills also have changed over to this pricing procedure. Meanwhile, reports are circulating in the trade here that a few makers of copper products have been paying premiums over the 23.50-cent level for copper recovered from scrap.

Lead — Total stocks of lead held by smelters and refiners on Oct. 1 declined further to 114,272 tons, or 3025 tons below the Sept. 1 figure, according to American Bureau of Metal Statistics. Stocks at the end of September were smallest since May, 1942.

Zinc — Stocks of slab zinc increased during October to 44,431 tons from 41,117 tons at the end of September, but part of this increase was due to a delay in issuing export licenses for the former month. Production rose to 70,716 tons in October from 64,721 tons in the previous month, while shipments eased to 67,850 tons from 68,850. During October, 3048 tons were for the government account compared with 2777 tons in September while 2603 tons were exported against 5083 tons in September. Unfilled orders at the end of October totaled 48,130 tons compared with 50,939 tons at the end of the preceding month and 72,224 tons at the end of February, the 1948 high.

Tin — World production of tin in concentrates during August was about 12,200 long tons compared with 12,700 tons in July, according to the International Tin Study Group. The decline was attributed to a drop in Bolivian exports to 2502 tons, in Malayan exports to 3975 tons. World production of tin metal in August declined to 13,200 tons from 15,200 tons in July. At the end of July, world stocks of tin in concentrates and tin metal totaled 146,000 tons compared with 136,900 tons on Dec. 31, 1947, and 154,500 tons on Dec. 31, 1946.

Poduction of tin concentrates in the Netherlands East Indies in October was the equivalent of 2725 tons of fine tin compared with 2584 tons in September and 1715 tons in the like 1947 month. For the first ten months of this year, output totaled 24,361 tons compared with 12,400 tons during the like 1947 period. Shipments of Malayan tin in October amounted to 4686 tons, of which the United States received 3600 tons.

Output of refined tin by the Longhorn, Tex., smelter in October dropped to 2296 tons from 2859 tons in September and 3509 tons in October, 1947. Output for the first 10 months totaled 30,602 tons compared with 27,492 tons for the like 1947 period.

Aluminum — Leading secondary aluminum smelters have advanced prices ½ to ¾-cent on foundry grades of ingot and 1¼ cents on deoxidizing grades. The advance was attributable to continued inability of smelters to obtain scrap except at further advances in prices. Smelters' inventories of scrap are approaching the minimum level.

Silver—Handy & Harman's official price for silver declined ½-cent Nov. 8 due to heavy scrap shipments to some large fabricators who temporarily withdrew from the new silver market.

Arranges for Lead Stockpile

Washington — Primary lead producers and importers met last week with Secretary of Commerce Charles Sawyer and Munitions Board Chairman D. F. Carpenter under provisions of Public Law 395, and agreed to cooperate in furnishing lead for the strategic materials stockpile program.

Representatives of the lead industry agreed that procurement of lead for the stockpile should be handled on an individual company basis through negotiations with the Bureau of Federal Supply, Treasury Department.

The goal for lead procurement for the stockpile program is 70,000 tons, less that amount already under procurement contract, all to be delivered prior to June 30, 1949.

Government representatives at today's meeting expressed satisfaction with the action taken by the lead producers and importers.

Remelt Aluminum Output Gains

Washington — Output of aluminum ingot at secondary smelters rose 16 per cent to 16,586 short tons in August, and was greater than for any month since March, according to the Bureau of Mines. The trend toward accumulation of low-grade items of scrap, which had been noted in June and July, was discontinued, and smelter receipts of some of the more desirable grades of scrap were increased in August. Total scrap inventories at smelters plants declined 4 per cent during the month, the greatest decrease occurring in stocks of irony aluminum scrap. Use of aluminum scrap by ingot makers gained 17 per cent, totaling 18,951 tons in August compared with 16,152 tons in July. Consumption of new scrap increased 21 per cent, and that of old scrap 13 per cent.

Production of aluminum-copper-silicon alloy rose 13 per cent to total 7919 tons in August. Output of deoxidizing ingot reversed its July decline, rising 52 per cent. Production of No. 12 ingot increased 3 per cent, and that of aluminum-silicon alloy gained 66 per cent to total 965 tons.

Arizona Miners To Combat Attack on Copper Excise Tax

Phoenix, Ariz.—Plans are being formulated by the Arizona Copper Tariff Board to combat the attack which is expected to be made on the copper excise tax in the next session of Congress. Briefs for presentation to Congress are being prepared and will be discussed at a meeting of the board members here Nov. 29.

Sam H. Morris, chairman of the board, is now in Washington sizing up the situation. He reports he has found a determined effort will be made by eastern manufacturers and owners of foreign copper mines to take advantage of the present abnormal situation to eliminate the excise completely, or suspend it for a long period, and that an aggressive presentation must be made by Arizona and other copper-producing states, to prevent something happening which may create a serious hazard to domestic economy and national security in the future.

Charles F. Willis, assistant secretary to the Arizona Copper Tariff board, states that, "the board recognizes that, at the moment, no copper excise tax is justified or necessary and that there should be a free flow of foreign metal to the United States, but it is a temporary situation which is bound to change. Arizona and other western copper-producing states must see to it that the suspension of the tax is only for short periods and no permanent policy is created."

The Arizona group is willing to go along with a year-to-year suspension, but is fearful of the damage to domestic economy and national security if a long-term suspension were enacted by Congress. It is pointed out that because of unusual demands for copper, there is a shortage of copper in the country at present and that it is necessary to bring in foreign metal to meet the pentup demand and the refilling of the pipelines of commerce but that, once the accumlated demand is filled, there would be a definite need for resumption of the copper excise tax. It was pointed out that this tax is merely sufficient to place the United States mines on a comparable competitive basis with foreign mines which have cheap labor, poor working conditions and low-cost water transportation to eastern markets.

NONFERROUS METAL PRICES

(Cents per pound, carlots, except as otherwise noted)

Copper: Electrolytic, 23.50c, Conn. Valley; Lake, 23.62½c, Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 22.00c; 88-10-2 (No. 215) 31.00c; 80-10-10 (No. 305) 27.25c; No. 1 yellow (No. 405) 17.50-18.00c.

Zinc: Prime western 15.50c, brass special 15.75c, intermediate 16.00c, East St. Louis; high grade 16.50c, delivered.

Lead: Common 21.30-21.35c, chemical and corroding 21.40c, St. Louis.

Primary Aluminum: 99% plus, ingots 17.00c, pigs 16.00c. Base prices for 10,000 lb and over, fob shipping point, freight allowed.

Secondary Aluminum: Piston alloy (No. 122 type) 25.75-26.25c; No. 12 foundry alloy (No. 2 grade) 25.25-26.00c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 27.50-28.50c; grade 2, 26.50-27.00c; grade 3, 25.50-26.25c; grade 4, 24.75-25.25c. Prices include freight at carload rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, fob Freeport, Tex.

Tin: Grade A, 99.8% or higher (including Straits) $1.03; grade B, 99.8% or higher, not meeting specifications for grade A, with 0.05% max. arsenic, $1.028; grade C, 99.65-99.79%, incl., $1.024; 99.5-99.649% $1.024, grade F, 98-98.999% $1.015 for tin content. Prices are ex-dock, New York, in 5-ton lots.

Antimony: American 99-99.8% and over but not meeting specifications below, 38.50c; 99.8% and over (arsenic 0.05% max.; other impurities, 0.1% max.) 39.00c, fob Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00c; 25-lb pigs, 42.50c; shot nom.; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 40.50c. Prices include import duty.

Mercury: Open market, spot, New York $76-$78 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $1.90, del.; special or patented shapes, $2.

Cobalt: 97-98%, $1.65 per lb for 550 lb (keg); $1.67 per lb for 100 lb (case); $1.72 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 74.25c per ounce.

Platinum: $93-$96 per ounce.

Palladium: $24 per troy ounce.

Iridium: $110-$115 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, fob mill)

Sheet: Copper 37.18; yellow brass 33.75; commercial bronze, 95%, 37.11; 90%, 36.63; red brass, 85%, 35.64; 80%, 35.16; best quality, 34.63; nickel silver, 18%, 46.41; phosphor-bronze, grade A, 5%, 56.05.

Rods: Copper, hot rolled 33.03; cold drawn 34.28; yellow brass, free cutting, 33.44; commercial bronze, 95% 36.80; 90% 36.32; red brass, 85% 35.33; 80% 34.85.

Seamless Tubing: Copper 37.22; yellow brass 36.76; commercial bronze 90% 39.29; red brass 85% 38.55; 80% 38.07.

Wire: Yellow brass 34.04; commercial bronze, 95% 37.40; 90% 36.92; red brass, 85% 35.93, 80% 35.45; best quality brass 34.92.

Copper Wire: Bare, soft, fob eastern mills, c.l. 29.42½c, l.c.l. 29.92½-30.05c; weatherproof, fob eastern mills, c.l. 29.60-29.85c, l.c.l. 30.35c; magnet, delivered, c.l. 32.75-33.50c, 15,000 lb or more 33.00-33.75c, l.c.l. 33.50-34.25c.

ALUMINUM

Sheets and Circles: 2S and 3S mill finish c.l. (Two producers quote 1-cent per pound lower.)

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	26.9	...	...
0.135-0.096	12-48	27.4	...	...
0.095-0.077	12-48	27.9	26.0	29.6
0.076-0.068	12-48	28.5	26.2	29.8
0.067-0.061	12-48	28.5	26.2	29.8
0.060-0.048	12-48	28.7	26.4	30.1
0.047-0.038	12-48	29.1	26.6	30.4
0.037-0.030	12-48	29.5	27.0	30.9
0.029-0.024	12-48	29.9	27.3	31.3
0.023-0.019	12-36	30.5	27.7	31.8
0.018-0.017	12-36	31.1	28.3	32.6
0.016-0.015	12-36	31.8	28.9	33.5
0.014	12-24	32.7	29.7	34.6
0.013-0.012	12-24	33.6	30.4	35.5
0.011	12-24	34.6	31.3	36.7
0.010-0.0095	12-24	35.6	32.3	38.0
0.009-0.0085	12-20	36.8	33.4	39.5
0.008-0.0075	12-20	38.1	34.6	41.1
0.007	12-18	39.5	35.9	42.9
0.006	12-18	41.0	37.2	47.0

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	—Hexagonal— R317-T4	—Hexagonal— 17S-T4
0.125	48.0	...	...
0.156-0.203	41.0	...	...
0.219-0.313	38.0	...	...
0.344	37.0	...	47.0
0.375	36.5	45.5	44.0
0.406	36.5	...	...
0.438	36.5	45.5	44.0
0.469	36.5	...	...
0.500	36.5	45.5	44.0
0.531	36.5	...	...
0.563	36.5	...	41.5
0.594	36.5	...	...
0.625	36.5	43.0	41.5
0.656	36.5	...	...
0.688	36.5	...	41.5
0.750-1.000	35.5	40.5	39.0
1.063	35.5	...	37.5
1.125-1.500	34.5	39.0	37.5
1.563	34.5	...	37.5
1.625	33.5	...	36.5
1.688-2.000	33.5	...	...
2.125-2.500	32.5	...	...
2.625-3.375	31.5	...	...

LEAD

(Prices to jobbers, fob Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more, $27.25 per cwt.; add 50c per cwt., 10 sq ft to 140 sq ft; $1.25, less than 10 sq ft; $1, circles and segments. Pipe: Full coils, $27.25 per cwt; cut coils, $27.50. Traps and Bends: List price plus 80%.

ZINC

Sheets, 20.00-20.50c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 18.75-19.50c, fob mill, 36,000 lb and over. Plates, not over 12-in., 17.75-18.50c; over 12-in., 18.75-19.50c.

NICKEL

(Base prices, fob mill.)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, fob mill.)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c. Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb., 35.00-36.00c.

Plating Materials

Chromic Acid: 99.9%, flake, fob Philadelphia, carloads, 26.00c; 5 tons and over 26.50c; 1 to 5 tons, 27.00c; less than 1 ton, 27.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed 33.84c; oval 33.34c; electrodeposited, 31.09c; cast, 30.12c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 46.00c, fob Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 16.00c; 1000 to 19,900 lb, 15.00c, fob Niagara Falls, N. Y.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 26.25c; over 250 lb, 25.25c, fob Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00c; under 10 lb, 64.00c; fob Cleveland. Add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 26.50c; 275-lb, or 500-lb bbl, 24.50c, fob Cleveland, freight allowed on barrels, or 3 or more kegs.

Tin Anodes: Bar, 1000 lb and over 119.00c; 500 to 999 lb, 119.50c; 200 to 499 lb, 120.00c; less than 200 lb, 121.50c; ball, 1000 lb and over, 121.25c; 500 to 999 lb, 121.75c; 200 to 499 lb, 122.25c; less than 200 lb, 123.75c fob Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 71.8c; 100 or 300 lb drums only, 100 to 500 lb, 63.6c; 600 to 1900 lb, 61.2c; 2000 to 9900 lb, 59.4c. Prices fob Sewaren, N. J.

Zinc Cyanide: 100-lb drums 39.25c, fob Cleveland; 39.00c, Detroit; 38.00c, fob Philadelphia. **Stannous Sulphate:** Less than 2000 lb, in 100 lb kegs, 100.00c, in 400 lb bbl, 99.00c; more than 2000 lb, in 100 lb kegs, 99.00c, in 400 lb bbl, 98.00c, f.o.b. Carteret, Wis.

Scrap Metals

BRASS MILL ALLOWANCES

(Based on 23.50c, Conn., for copper)

Prices in cents per pound for less than 15,000 lb fob shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.125	21.125	20.375
Yellow brass	18.000	17.750	17.125
Commercial Bronze			
95%	20.125	19.875	19.375
90%	19.750	19.500	19.000
Red brass			
85%	19.750	19.500	19.000
80%	19.500	19.250	18.750
Best Quality (71-79%)	19.000	18.750	18.250
Muntz Metal	17.250	17.000	16.500
Nickel, silver, 10%	19.625	19.375	9.813
Phos. bronze, A.	22.625	22.375	21.375
Naval brass	17.750	17.500	17.000
Manganese bronze	17.750	17.500	16.875

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 19.75, No. 2 copper 18.75, light copper 17.75, composition red brass 17.00, auto radiators 14.00, heavy yellow brass 12.50-12.75, brass pipe, 13.50.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 20.50-21.00, No. 2 copper 19.50-20.00, light copper 18.50-19.00, refinery brass (60% copper), per dry copper content 18.75.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire No. 1 18.00-18.50, No. 2 17.00-17.50, light copper 16.00-16.50, No. 1 composition red brass 15.25-15.50, No. 1 composition turnings 14.75-15.00, mixed brass turnings 8.75-9.00, new brass clippings 15.00-15.50, No. 1 brass rod turnings 12.00-12.50, light brass 8.25-8.50, heavy yellow brass 11.00-11.25, new brass rod ends 12.50-13.00, auto radiators, unsweated 12.75-13.00, cocks and faucets 12.25-12.50, brass pipe 12.75-13.25.

Lead: Heavy 19.50-20.00, battery plates 12.25-12.75, linotype and stereotype 18.00-18.50, electrotype 16.50-17.00, mixed babbitt 15.75-16.25, solder joints, 19.75-20.25.

Zinc: Old zinc 8.50-9.00, new die cast scrap 8.25-8.50, old die cast scrap 6.00-6.50.

Tin: No. 1 pewter 65.00-67.00, block tin pipe 83.00-84.00, No. 1 babbitt 51.00-54.00, siphon tops 50.00-52.00.

Aluminum: Clippings 2S 15.00-15.50, old sheets 11.00-11.50, crankcase 11.00-11.50, borings and turnings 6.00-6.50, pistons, free of struts, 11.00-11.50.

DAILY PRICE RECORD

	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Oct. Avg.	23.50	19.325	15.173	103.00	16.846	37.423	40.00	77.226
Sept. Avg.	23.50	19.325	15.00	103.00	16.50	35.00	40.00	75.284
Nov. 1-6	23.50	21.30–21.35	15.50	103.00	17.00	38.50	40.00	74.75
Nov. 8-11	23.50	21.30–21.35	15.50	103.00	17.00	38.50	40.00	74.25

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, fob Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery, unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$42.50-43.00*
No. 2 Heavy Melt. Steel	42.50-43.00*
No. 1 Busheling	42.50-43.00*
Nos. 1, 2 Bundles	42.50-43.00
No. 3 Bundles	40.50-41.00
Machine Shop Turnings	37.50-38.00
Mixed Borings, Turnings	37.50-38.00
Short Shovel Turnings	39.50-40.00
Cast Iron Borings	39.50-40.00
Bar Crops and Plate	49.00-50.00
Low Phos. Steel	49.50-50.00
Heavy Turnings	39.50-40.00

Cast Iron Grades

No. 1 Cupola	65.00-66.00
Machinery Cast	72.00-73.00
Charging Box Cast	61.00-62.00
Heavy Breakable Cast	60.00-61.00
Malleable	74.00-75.00
Brake Shoe	57.50-58.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.50-44.00
R.R. Malleable	75.00-80.00
Axles	55.25-56.25
Rails, Rerolling	59.00-60.00
Rails, Random Lengths	56.00-57.00
Rails, 3 ft and under	62.00-63.00
Rails, 18 in. and under	63.00-64.00
Railroad Specialties	57.50-58.00
Uncut Tires	54.50-55.00
Angles, Splice Bars	53.00-54.00

* Plus applicable freight springboard.

CLEVELAND

No. 1 Heavy Melt. Steel	$42.00-42.50*
No. 2 Heavy Melt. Steel	42.00-42.50*
No. 1 Busheling	42.00-42.50*
Nos. 1 & 2 Bundles	42.00-42.50*
Machine Shop Turnings	37.00-37.50
Mixed Borings, Turnings	36.50-38.50
Short Shovel Turnings	38.00-38.50
Cast Iron Borings	38.00-38.50
Bar Crops and Plate	47.00-47.50
Punchings & Plate Scrap	47.00-47.50
Heavy Turnings	42.00-43.00
Alloy Free Turnings	40.00-41.00
Cut Structurals	48.50-51.50

Cast Iron Grades

No. 1 Cupola	75.00-77.00
Charging Box Cast	62.00-64.00
Stove Plate	65.00-67.00
Heavy Breakable Cast	57.00-62.00
Unstripped Motor Blocks	62.00-64.00
Malleable	79.00-81.00
Brake Shoes	55.00-57.00
Clean Auto Cast	75.00-77.00
No. 1 Wheels	64.00-66.00
Burnt Cast	59.00-61.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.00-44.00*
R.R. Malleable	80.00-82.00
Rails, Rerolling	60.00-66.00
Rails, Random Lengths	60.00-61.00
Rails, 3 ft and under	63.00-66.00
Cast Steel	55.00-57.00
Railroad Specialties	58.00-60.00
Uncut Tires	58.00-59.00
Angles, Splice Bars	61.00-63.00

* Plus applicable freight springboard on earmarked material.

VALLEY

No. 1 Heavy Melt. Steel	$42.50-43.00*
No. 2 Heavy Melt. Steel	42.50-43.00
No. 1 Bundles	42.50-43.00
Machine Shop Turnings	37.00-39.00
Short Shovel Turnings	39.00-39.50
Cast Iron Borings	38.50-39.00
Low Phos.	48.50-50.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.00-44.00*

* Plus applicable freight springboard.

MANSFIELD

Machine Shop Turnings	$37.50-38.00
Short Shovel Turnings	39.50-40.00

CINCINNATI

No. 1 Heavy Melt. Steel	$42.00
No. 2 Heavy Melt. Steel	42.00
No. 1 Busheling	42.00
Nos. 1 & 2 Bundles	42.00
Machine Shop Turnings	36.00
Mixed Borings, Turnings	36.00
Short Shovel Turnings	38.00
Cast Iron Borings	37.00

Cast Iron Grades

No. 1 Cupola Cast	63.00
Charging Box Cast	53.00
Heavy Breakable Cast	59.00
Stove Plate	55.00
Unstripped Motor Blocks	56.00
Brake Shoes	50.00
Clean Auto Cast	63.00
Drop Broken Cast	71.00

Railroad Scrap

No. 1 R.R. Heavy Melt	43.00
R.R. Malleable	75.00
Rails, Rerolling	62.00
Rails, Random Lengths	58.00
Rails, 18 in. and under	63.00

DETROIT

(Brokers' buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$37.50-38.00
No. 1 Busheling	37.50-38.00
Nos. 1 & 2 Bundles	37.50-38.00
No. 3 Bundles	37.50-38.00
Machine Shop Turnings	31.50-32.00
Mixed Borings, Turnings	31.50-32.00
Short Shovel Turnings	32.50-33.00
Cast Iron Borings	32.50-33.00
Punchings & Plate Scrap	42.50-43.00

Cast Iron Grades

No. 1 Cupola Cast	60.00-65.00
Heavy Breakable Cast	54.00-59.00
Clean Auto Cast	60.00-65.00

BUFFALO

No. 1 Heavy Melt. Steel	$48.00-49.00
No. 2 Heavy Melt. Steel	41.75-42.25
No. 1 Busheling	41.75-42.25
No. 1 & 2 Bundles	41.75-42.25
Machine Shop Turnings	36.75-37.25
Mixed Borings, Turnings	36.75-37.25
Cast Iron Borings	37.75-38.25
Short Shovel Turnings	38.75-39.25
Low Phos.	49.00-51.00

Cast Iron Grades

Mixed Cupola	65.50-66.50
No. 1 Cupola	68.00-69.00
Heavy Breakable Cast	55.00-57.00
Malleable	70.00-75.00
Clean Auto Cast	62.00-64.00

Railroad Scrap

Rails, 3 ft. and under	59.00-61.00
Railroad Specialties	58.00-60.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$45.00-45.50
No. 2 Heavy Melt. Steel	41.50
No. 1 Busheling	41.50
Nos. 1 & 2 Bundles	41.50
No. 3 Bundles	39.50
Machine Shop Turnings	37.50
Mixed Borings, Turnings	37.50
Short Shovel Turnings	38.50
Bar Crop and Plate	49.00-51.00
Punchings & Plate Scrap	49.00-51.00
Cut Structurals	49.00-51.00
Elec. Furnace Bundles	47.00-48.00
Heavy Turnings	45.50-46.50
No. 1 Chemical Borings	46.00-46.50

Cast Iron Grades

No. 1 Cupola Cast	63.00-65.00
No. 1 Machinery Cast	67.00-68.00
Charging Box Cast	64.00-65.00
Heavy Breakable Cast	62.00-62.50
Unstripped Motor Blocks	59.50
Malleable	80.00-81.00
Clean Auto Cast	64.00-65.00
No. 1 Wheels	69.00-70.00

NEW YORK

(Brokers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$39.00
No. 2 Heavy Melt. Steel	37.00
No. 1 Busheling	37.00
Nos. 1 & 2 Bundles	37.00
No. 3 Bundles	35.00
Machine Shop Turnings	29.00-29.50
Mixed Borings, Turnings	29.00-29.50
Short Shovel Turnings	30.00-31.50
Punchings & Plate Scrap	42.00-42.50
Cut Structurals	42.00-42.50
Elec. Furnace Bundles	42.00-42.50

Cast Iron Grades

No. 1 Cupola Cast	57.00-58.00
Charging Box Cast	57.00-58.00
Heavy Breakable	58.00
Unstripped Motor Blocks	53.50-54.50
Malleable	68.00-69.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$38.90
No. 2 Heavy Melt. Steel	34.40
No. 1 Bundles	34.40
No. 1 Busheling	34.40
Machine Shop Turnings	29.90
Mixed Borings, Turnings	29.90
Short Shovel Turnings	31.90
Bar Crops and Plate	40.00-41.00
Punchings & Plate Scrap	40.00-41.00
Chemical Borings	38.00-39.00

Cast Iron Grades

No. 1 Cupola Cast	60.00-65.00
Heavy Breakable Cast	55.00-58.00
Stove Plate	54.00-55.00
Unstripped Motor Blocks	50.00-52.00
Clean Auto Cast	54.00-56.00

CHICAGO

No. 1 Heavy Melt. Steel	$41.50-42.00
No. 2 Heavy Melt. Steel	41.50-42.00
No. 1 Bundles	41.50-42.00
No. 2 Bundles	41.50-42.00
No. 3 Bundles	39.50-40.00
Machine Shop Turnings	36.50-37.00
Mixed Borings, Turnings	36.50-37.00
Short Shovel Turnings	38.50-39.00
Cast Iron Borings	37.50-38.00
Bar Crops and Plate	47.00-48.00
Punchings	48.00-49.00
Elec. Furnace Bundles	42.50-43.00
Heavy Turnings	41.00-41.50
Cut Structurals	46.50-47.00

Cast Iron Grades

No. 1 Cupola Cast	70.00-71.00
Clean Auto Cast	70.00-71.00
No. 1 Wheels	59.00-61.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	45.00-46.00
Malleable	81.00-82.00
Rails, Rerolling	68.00-69.00
Rails, Random Lengths	59.00-60.00
Rails, 3 ft and under	60.00-61.00
Rails, 18 in. and under	63.00-64.00
Railroad Specialties	55.50-56.50
Angles, Splice Bars	56.50-57.50

ST. LOUIS

No. 1 Heavy Melt. Steel	$44.00-45.00
No. 2 Heavy Melt. Steel	40.00-41.00
Machine Shop Turnings	35.00-36.00
Short Shovel Turnings	36.50-37.50

Cast Iron Grades (Fob shipping point)

No. 1 Cupola Cast	65.00-66.00
Mixed Cast	56.00-58.00
Heavy Breakable Cast	59.00-60.00
Brake Shoes	60.00-61.00
Clean Auto Cast	65.00-67.00
Burnt Cast	59.00-60.00

Railroad Scrap

R.R. Malleable	71.00-72.00
Rails, Rerolling	63.00-65.00
Rails, Random Lengths	56.00-59.00
Rails, 3 ft and under	60.00-61.00
Uncut Tires	51.00-52.00
Angles, Splice Bars	54.00-56.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$39.50
No. 2 Heavy Melt. Steel	39.50
No. 1 Busheling	39.50
Nos. 1 & 2 Bundles	39.00
No. 3 Bundles	37.00
Long Turnings	24.50
Short Shovel Turnings	26.00-27.00
Cast Iron Borings	25.00
Bar Crops and Plate	40.00
Cut Structurals	38.50

Cast Iron Grades

No. 1 Cupola Cast	63.00
Stove Plate	60.00-62.00
No. 1 Wheels	59.00-61.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	38.00
R.R. Malleable	nom.
Axles, Steel	50.00
Rails, Rerolling	53.00-55.00
Rails, Random Lengths	45.00-48.00
Rails, 3 ft and under.	53.00-55.00
Angles and Splice Bars	52.00-53.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$27.50
No. 2 Heavy Melt Steel	*27.50
No. 1 Busheling	*27.50
Nos. 1 & 2 Bundles	*27.50
No. 3 Bundles	*24.50
Machine Shop Turnings	*18.00
Bar Crops and Plate	*27.50
Cast Steel	*27.50
Alloy Free Turnings	*18.00
Cut Structurals	*27.50

Cast Iron Grades

No. 1 Cupola Cast	50.00-65.00

Railroad Scrap

No. 1 Heavy Melting	*28.50
Axles	*34.00
Rails, Random Lengths	*29.00

* Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$27.50
No. 2 Heavy Melt. Steel	27.50
No. 1 Busheling	27.50
Nos. 1 & 2 Bundles	27.50
No. 3 Bundles	24.50
Machine Shop Turnings	21.00-22.50
Mixed Borings, Turnings	21.00-22.50
Punchings & Plate Scrap	35.00
Cut Structurals	26.00-28.00

Cast Iron Grades

No. 1 Cupola Cast	50.00
Heavy Breakable Cast	35.00
Stove Plate	30.00
Unstripped Motor Blocks	32.50
Malleable	40.00
Brake Shoes	35.00
Clean Auto Cast	40.00
No. 1 Wheels	37.50-40.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	28.50
Railroad Malleable	30.00
Rails, Random Lengths	30.00-32.00
Angles and Splice Bars	28.50

LOS ANGELES

No. 1 Heavy Melt. Steel	$27.50
No. 2 Heavy Melt. Steel	27.50
Nos. 1 & 2 Bundles	27.50
Machine Shop Turnings	20.00
Mixed Borings, Turnings	15.50-16.00
Punchings & Plate Scrap	28.00
Elec. Furnace Bundles	28.00

Cast Iron Grades

No. 1 Cupola Cast	50.00-55.00

HAMILTON, ONT.

(Ceiling prices, delivered)

Heavy Melt.	$23.00
No. 1 Bundles	23.00
Mechanical Bundles	21.00
Mixed Steel Scrap	19.00
Mixed Borings, Turnings	17.00
Rails, Remelting	23.00
Rails, Rerolling	26.00
Bushelings	17.50
Bushelings, new factory, prep'd	21.00
Bushelings, new factory, unprep'd	16.00
Short Steel Turnings	17.00

Cast Iron Grades*

No. 1 Cast	48.00-50.00
No. 2 Cast	44.00-45.00

* Removed from price control Aug. 9, 1947; quoted on basis of fob shipping point.

Announcing . . . .

THE OPENING OF OUR
SAN FRANCISCO OFFICE
443 PACIFIC GAS & ELECTRIC CO., BLDG.
25 BEALE STREET

STANLEY M. CLASTER • *DISTRICT MANAGER IN CHARGE*

This strategically located office continues a policy of expansion consistent with our aim of better customer service.

LURIA BROTHERS & COMPANY, INC.

LINCOLN-LIBERTY BUILDING
PHILADELPHIA 7, PENNSYLVANIA

Yards

LEBANON, PA. • READING, PA. • DETROIT (ECORSE), MICH.
MODENA, PA. • PITTSBURGH, PA.

Branch Offices

BIRMINGHAM, ALA.
418 Empire Bldg.

BOSTON, MASS.
Statler Bldg.

BUFFALO, N. Y.
Genesee Bldg.

CHICAGO, ILL.
100 W. Monroe St.

CLEVELAND, O.
1022 Midland Bldg.

DETROIT, MICH.
2011 Book Bldg.

HOUSTON, TEXAS
Cotton Exchange

LEBANON, PA.
Luria Bldg.

NEW YORK, N. Y.
Woolworth Bldg.

PITTSBURGH, PA.
Oliver Bldg.

PUEBLO, COLO.
P. O. Box #1596

READING, PA.
Luria Bldg.

ST. LOUIS, MO.,
2110 Railway Exchange Bldg.

SAN FRANCISCO, CAL.
Pacific Gas & Electric Co., Bldg.

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Sheets, Strip . . .

Producers reduce allotments for January and February due to expected heavy carryovers

Sheet Prices, Page 164

Pittsburgh — Sheet and strip interests have reduced order acceptance for January and February rolling schedules to make up for yearend carryover tonnage. Some producers have not established customers' allotments beyond February because of the uncertain status of extent of commitments under the voluntary allocation programs after that date. The steel industry has agreed to continue to provide steel after Feb. 28 for the armed forces, involving 102,505 tons monthly; Atomic Energy Commission projects, 16,244 tons; and National Advisory Committee for aeronautics, 1926 tons monthly. Status of the other programs is expected to remain in doubt pending official action in respect to extending Public Law 395. Total steel commitments under the 12 voluntary allocation programs involves about 544,000 tons monthly, including tin plate directive. Some interests under these programs, notably military, failed to place orders with their suppliers in time to meet necessary production "lead time." It is probable this tonnage will be made up in March. Some metalworking companies sharing in these programs have refused to place orders with designated mills, because of high freight charges involved. Chief argument against industry-wide allocations of steel, other than the objection of governmental interference with industry operations, is the contention that output of finished steel will be retarded somewhat under such a program because of forced acceptance of order specifications not suited to particular mills.

New York — Producers of carbon sheets continue to move cautiously in setting up consumer quotas on tonnage for shipment after the turn of the year. No allotments, apart from certified allotments, have been set up generally beyond January, and in cases where January quotas have been set up the tonnages involved will represent arrearages for the most part. There should be fairly early action on February quotas, but until the matter of certified work after that month is clarified there will likely be delay in alloting tonnage for March. In other words, there is not only the question as to whether there may be a general extension of voluntary allotments after Feb. 28, when the current law governing these shipments is scheduled to expire, but question as to what action the new Congress may take, if any, with respect to mandatory allotments. In some quarters, mandatory distribution is not expected to develop for some months, if at all, assuming that the international situation does not become increasingly critical.

Boston — Among flat-rolled products, only tin mill and electrical sheets are allocated by most mills for all of first quarter; several are not beyond January on cold-rolled carbon sheets. While impact of mill pricing is minimized by strong demand, sales executives are reviewing the distribution pattern to determine what products will be competitive and where. Enamelling and electrical sheets will be competitive for Pittsburgh district mills in this area with Youngstown focal point for the latter. Product, grade, size and points of production and destination are the controlling factors in future distribution. A product desirable to a mill for delivery to Maine might not be so for delivery to Connecticut. Consumer attitude as to mill pricing also will be a consideration eventually in any return to the basing point system; probably at least 30 per cent favor mill pricing with the balance opposed or uncertain.

Philadelphia—More delay in setting up quotas for shipment after the end of this quarter is noted in carbon sheets than perhaps in any other major product. For instance, one leading producer has set up allotments for the first two months of next year on several products, but up until late last week he had taken no action on sheets. Several other leading sellers also had taken no action. This may be ascribed in part to the extreme pressure for sheets and to the fact that arrearages as to the end of this year are proving more difficult to gage than had been anticipated. Further, distribution is still undergoing adjustment as a result of the mid-year switch in the steel pricing system. In few cases, insofar as the major products are concerned, is it likely that action will be taken for the entire first quarter until after the outlook with

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respect to certified tonnage has been clarified. There are not only questions relating to the extension of voluntary allotment programs after the end of February, but also to what the policy of Congress may be with respect to mandatory controls. Some trade leaders, however, do not look for mandatory controls short of a war crisis. The steel products industry advisory committee is scheduled to meet this week in Washington to give further consideration to the extension of certain voluntary allotment programs.

Cleveland — Breakdown of a broadside stand at Republic Steel Corp.'s 98-inch hot strip and sheet mill at Cleveland temporarily limits rolling of sheet and strip to widths of not more than 48 in. The breakdown occurred when a shaft 26 inches in diameter snapped. Repair work will require about two months. The Cleveland mill's sheet and strip production will not suffer tonnagewise, the tonnage that ordinarily would go into the wide product now being diverted into narrower widths.

Cincinnati — Demand for sheets shows no sign of a dip, in fact the pressure for tonnage on mills makes difficult the forming of a first quarter schedule. A few declines in requirements were small, and more than absorbed by other consumers. Mills of the district so far are standing pat on base prices, with exception of the automatic increase in galvanized, and on extras, although they are studying the entire price setup. There is no hint of any imminent changes. Production is being held at a high level which may cut, as desired, the considerable carryover which had accummulated earlier in the year.

St. Louis — With good prospects that October's improved sheet output will continue through November, first-quarter allocations were to be placed this week. Cold mill tonnage was 20 per cent better than the previous month's and the same rate of climb is likely to continue the rest of the year, assuming adequate scrap supplies. Most mills now have 30 to 45 days of scrap. As result, first quarter production is expected to be an estimated 10 per cent over that of the fourth quarter. Demand, however, is unremitting and expected to remain so. Withdrawal of certain mills from this area has sharply increased pressure for sheets on local steelmakers.

Los Angeles — Supply and demand are getting farther out of balance, with no real relief expected for many months. Sheet and strip consumers have been informed by some suppliers that quotas for next year will be lighter than in 1948, the estimated reduction being 40 per cent in one instance.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 164

Pittsburgh — Rail steel reinforcing and merchant bar quotations continue at high levels due to high prices and scarcity of scrap rails. Demand is still far in excess of supply. Prices range up to $5.35 per 100 pounds on both items, in contrast to new billet reinforcing bar mill price to consumers at $4.25 among mid-west and eastern producers. Rail steel bar interests report output remains under strict allocation with schedules extended 3 to 6 months. New billet reinforcing bar producers note no change in pattern of demand in recent weeks. Largest tonnage inquiries continue to originate from power plant expansion programs, requiring extensive foundation work.

Boston—An estimated 3500 tons of concrete reinforcing bars are up for placement, but distributors are reluctant to take on this volume at current allocation levels. Most interests are accepting small orders only and are not willing to commit themselves ahead on tonnage lots. Contractors are forced to shop for reinforcing material and frequently fill requirements from several fabricators.

Seattle — In view of an uncertain future, rolling mills are cautious in accepting new business for reinforcing bars. Few orders for the first quarter have been booked, although there is constant pressure from contractors, government agencies and other buying interests. Mills have sizable backlogs which are of first concern. The scrap situation is an immediate threat to future steel supplies.

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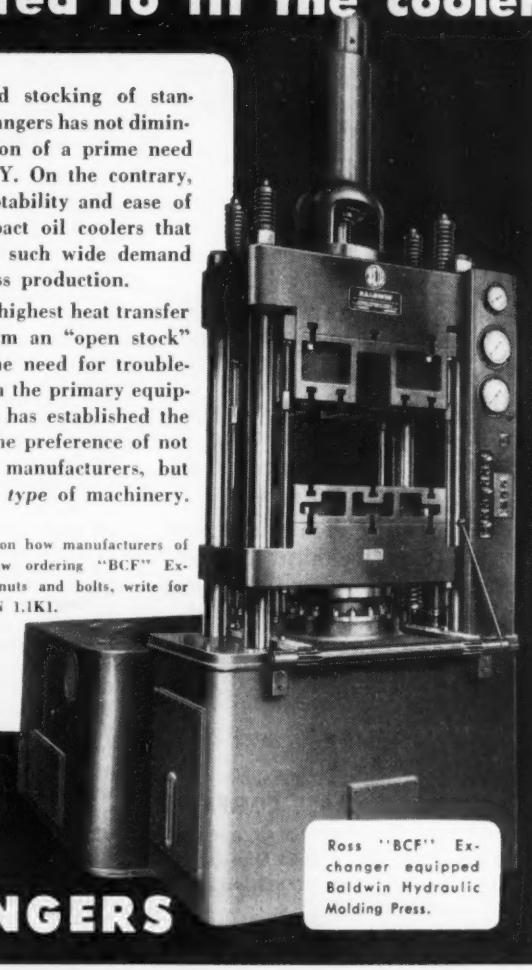

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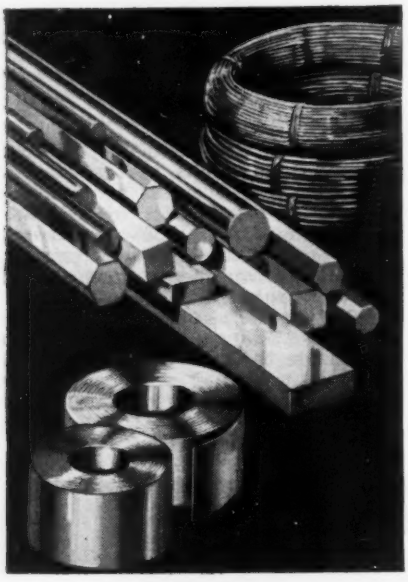

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Plates . . .

Plate Prices, Page 165

Pittsburgh — Jessop Steel Co. reduced its stainless clad plate 400 series prices, effective Nov. 1, at Washington, Pa., and Claymont, Del., from 1-3/4 to 2-3/4 cents per pound to following levels:

(cents per pound)

Grade	10%	20%
405	18.75	24.75
410	18.25	24.25
416	18.25	24.25
430	18.25	24.25
446	23.50	27.50

On same date Lukens Steel Co. reduced prices on its 300 series stainless clad plates from 1/2 to 1 cent per pound to level following:

(cents per pound)

Grade	10%	20%
304	22.50	26.50
316	27.00	31.00
347	25.00	29.00

Jessop Steel also revised quantity extras on clad sheets, effective Oct. 22, to conform with similar extras on clad plates. Formerly these extras were same as on solid stainless.

Maximum reduction on quantity extras for smaller quantities represents 8 cents per pound, with smaller reduction noted for larger quantities. Formerly the quantity extra for 10,000 pounds and over was base; now 1 cent is charged for the quantity bracket 10,000 to 20,000 pounds, while over 20,000 pounds is considered base.

Shortage of carbon plates is just as critical as in sheets, with constant heavy influx of new orders for barges, standby fuel tanks, and industrial machinery, in addiion to increased machinery, in addition to increased allocations programs. More plates are involved under the rescheduling of the freight car construction program now under consideration. Latest voluntary allocations program, not yet given final approval, is for construction of passenger vessels that can be converted into transports. This program has been tentatively set up for January and February shipment. It is reported that 8700 tons of plates, 1500 tons of structurals and 1200 tons of other steel products are involved.

Boston — While some mills have allocated plate tonnage for February, little tonnage has been assigned beyond that month. Although demand for plates is far in excess of supply, there is less pressure to place carbon plates as more consumers accept the inevitable and realize impossibility of obtaining more tonnage. Several tank fabricating shops have gone into production of stainless and clad-plate units for textile, paper and chemical industries; matter of plate supply is a factor in this switch. Demand for floor plate is at high level, far in excess of normal demand. While most mills discourage substitution of floor plates for carbon, end use of warehouse tonnage is difficult to trace and a considerable number of small tanks continue to be of floor plates.

Philadelphia — While most plate producers have not set up consumer quotas beyond January, and some not even for that month, one eastern mill is seriously considering setting up allotments for the entire first quarter, with adjustments in the final month depending upon what eventually develops with respect to the voluntary allocation programs. One leading producer has set up quotas for the first two months.

Bids on a super-liner will be taken Dec. 1 by the United States Maritime Commission.

Chicago — Suggestion made recently by a representative of the plate fabricating industry that allocations be extended into the realm of production as well as distribution to insure against shortage of particular products is regarded by some members of the steel producing industry as the natural outgrowth of any allocation system. Enough plates are now being channeled into "favored" industries that the shortage for other users is critical. It is widely felt that allocation plans must inevitably be all-inclusive or nonexistent. If a production allocation scheme were set up, with the mix weighted in the direction of plates, overall tonnage output undoubtedly could be raised; however, normal peacetime demand does not stress production of this item, and with pent-up demand for many products made with lighter flat-rolled steel still strong, a switch in mix would immediately spell greater hardships for producers and consumers.

Los Angeles — Users are anticipating their needs from 6 to 9 months ahead in order to get deliveries. One large project now pending, a series of 12 water storage tanks at Long Beach, will require 3500 tons of plates. South American export demand is strong, particularly in plates and angles for oil field equipment. But in the comparatively few cases where State Department export clearance can be obtained, delivery is complicated by the maritime tie-up. Shipment must be made by rail to New Orleans for reloading on vessels.

Inland Raises Rail Price

Chicago — Effective with shipments on and after Nov. 15, Inland Steel Co.'s base price on No. 1 standard tee rails will be increased from $3.20 per 100 pounds to $3.50, f.o.b. cars, works, Indiana Harbor, Ind. Simultaneously, extras were increased on lighter weight rails and joint bars.

Wilfred Sykes, president of the company, in a letter sent to presidents of railroads served by his company, disclosed that Inland has sold rails without profit for several years. The letter stated that Inland was advancing its rail price 30 cents per 100 pounds, effective Nov. 15.

Government Buying Steel

Philadelphia — Depot Quartermaster, Marine Corps, Department of Supply, 1100 South Broad St., is closing bids Nov. 15 on miscellaneous items, including 197 tons of galvanized sheets, 175 tons of carbon sheets and 40 tons of "flat steel." Small tonnages of steel bars and aluminum forms also are being figured.

Supply and Fiscal Department, Naval Air Material Center, Naval Base Station, Philadelphia 12, is receiving bids until Nov. 16 for furnishing approximately 167,000 pounds of 1/2-inch plate, 40 by 40 inches.

Wire . . .

Wire Prices, Page 165

Chicago—Despite high level of demand for wire products from farms, the combined result of excellent crops, high income and favorable weather, supply of certain items has come abreast of demand. Stocks of bale ties and poultry netting, in particular, are said to be nearly normal. Inventories of barbed wire fencing, steel posts and nails, however, are low and unbalanced.

Birmingham—Surprising as it is, the expected drop in demand for wire products from agricultural sources has failed to develop in anything like anticipated volume. Result is continued insistence for such items as fencing and nails and, in turn, continued scarcity in these items.

Structural Shapes . . .

Structural Shape Prices, Page 165

New York — Although a 2800-ton apartment house at 68th St. and 5th Ave. features awards, shape demand is still dominated by public work. The Board of Transportation has a 2500-ton project in Brooklyn up for bidding and there is considerable state bridge work. Also bids have just gone in on approximately 2000 tons for a section of the St. George municipal ferry terminal, Staten Island. Leading private inquiry involves 2000 tons for a power house in Kansas City, Mo., on which Ebasco Services Inc., this city, is now taking bids.

Pittsburgh — Successful bidders for the supply of structural parts for the proposed Conemaugh Dam, which bids totaled $1,335,841, have been announced by the district Army Engineers as follows: Koppers Co., Inc., Pittsburgh, $1,237,000 for slide gates, conduit liners, and all fixed metal for 14 crest gate openings; Treadwell Construction Co., Midland, Pa., $55,500 for deflector plates and sluice armor; and Mountain State Fabricating Co., Clarksburg, W. Va., $43,341 for bulkheads, bulkhead frames and guides. Bids for the actual construction of the $33 million Conemaugh Dam, near Saltsburg, Pa., are expected to be asked in January.

Boston—Structural fabricators are more realistic in estimating new tonnage in line with potential plain material prospects which are not bright; several have practically withdrawn with work now under contract delayed by lack of material. February allocations have been assigned in some cases, but no schedules beyond that month in first quarter are likely. New inquiry up for estimates is down, but is marked by a 800-ton power plant, Worcester; utilities are going ahead with powerhouse expansion generally.

Philadelphia—Public work continues to dominate the structural market, although there are evidences that this may not be sustained at present rate for long. Seasonal influences are beginning to bear more heavily and construction costs are reaching a point where it is proving difficult, with present budgets, to keep existing facilities in full repair, to say nothing of expanding them. Cities and various local communities are being confronted more and more with this problem. Meanwhile, new industrial expansion is spotty, and some contemplated programs are being held up, pending an opportunity to gage more accurately future political policies in Washington.

Chicago — General apathy to new inquiries continues, fabricators knowing that they can get only so much steel and it can't possibly go all the way around. Intensification of this feeling is sure to develop next quarter when customer quotas are cut further by reason of heavy carryovers and setaside tonnage for allocation plan participants. Industrial projects, as a general thing, have been squeezed out of the contest for available steel by government work, recent inquiries being featured by state and county bridge work. Several of these projects, aggregating about 1400 tons, come up for bids this week.

Seattle — Fabricating plants are having difficulty in maintaining normal operations in the face of restricted steel supplies which is due in part to the considerable tonnage still idle on strike-bound intercoastal carriers. Announcement of first quarter mill allocations is expected shortly, but there is no hope of obtaining sufficient quotas to cover requirements. Meanwhile plants are taking jobs that fit in with reduced inventories and supplies en route. Present shipments are all-rail.

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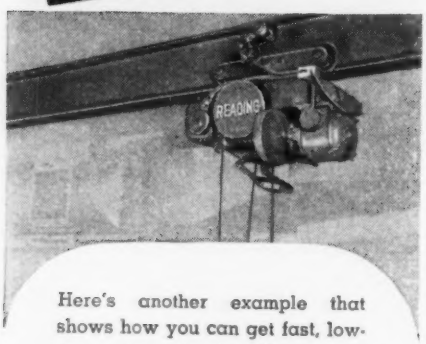

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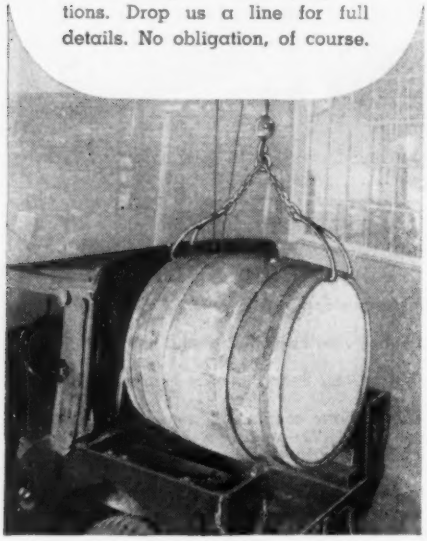

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Tin Plate . . .

Tin Plate Prices, Page 165

Pittsburgh — Indicated high level of tin plate requirements over coming months offers little hope to consumers of building up depleted stocks. Some producers have begun accepting specifications for first-quarter delivery of domestic tonnage. First-quarter export tonnage specifications are coming in generally on schedule. Limitations on pig tin consumption may prevent full utilization of production facilities for months ahead. On basis of modernization and expansion programs under way within the industry, 1949 tin plate production should exceed the anticipated new record to be established this year.

Steel Bars . . .

Bar Prices, Page 164

Philadelphia—Despite the fact that demand for hot carbon bars is less pressing than for major flat-rolled products, producers estimate there will be a carryover at the end of this year of three to five weeks. Substantial carryovers, in fact, are reflected in those consumer quotas which have been set up for early next year. No general action has yet been taken for the entire quarter, pending more definite word with respect to certified tonnage. On cold-drawn carbon bars, however, quotas for the full quarter have been established, this product being relatively little affected by voluntary allotments.

Alloy bars, both hot and cold, are available for delivery in 10 to 12 weeks at most mills, although some sellers are booked beyond that. Interest is shown in the exceptionally high rate, 101.5 per cent, of electric furnace production in October. However, this does not reflect an extreme high in alloy production, for carbon steel is also produced in electric furnaces. As a matter of fact, some alloy steel is also produced in open-hearth furnaces, which had an output last month in excess of 100 per cent.

New York — Hot carbon bar producers are still well behind on commitments, with the likelihood that arrearages at the end of this quarter will amount to four or five weeks' production in some instances. Most sellers have set up quotas for January and in a few scattered instances for February, but January tonnage will be comprised almost entirely of carryovers. Cold-drawn carbon bar quotas have been set up on a more extended basis.

Boston — First-quarter allocations of steel bars vary as to product and grades with hot-rolled carbon schedules covering but part of the period in most cases. Demand for alloys improves and, while not officially on allocation, screening of orders and tonnage in effect places those grades on quotas. Most users of carbon bars are taking full quotas this quarter; exceptions are a few forge shops producing small tools. While these are experiencing a slump in volume, shops forging for the automotive and aircraft industries are pressing for tonnage. Bolts and nuts are more competitive with some indirect concessions cropping out, but there is no slackening in demand for steel at mill levels.

Los Angeles — Demand for bars is heavy and well-diversified, although they have not been under as much consumer pressure as flat-rolled products. Supplies of bar stock are by no means adequate, nevertheless they show some improvement in quantity and variety.

Tubular Goods . . .

Tubular Goods Prices, Page 165

New York — Most producers of merchant pipe have opened books for first quarter, with schedules promptly filled. Quotas generally have been set up on about the same basis as for the current quarter. There is still an overwhelming demand.

In mechanical tubing, one seller of cold drawn, 1-1/2 inches and smaller, is able to offer shipments for January: 9/16 to 3/4-inch, inclusive, 12 to 20 gage, shipments within seven to nine weeks; and 13/16 to 2 inches inclusive, 14 to 20 gage, 11 to 13 weeks. Hot-finished mechanical tubing, 1-1/2 to 2-9/16 inches, 9 gage and heavier, is being offered for April shipment.

Cold-drawn pressure tubing, 1-1/2 inches and smaller, is available for January delivery. No promises on any sizes of hot-finished pressure tubing are being made by at least one large producer.

Reports are current that sizable shipments of European pipe are scheduled for this country. One is that approximately 65,000 tons of German pipe will start arriving in this country in February, coming in at the rate of about 2000 tons per month. Some European pipe is said to be scheduled for arrival on the Pacific Coast.

Pittsburgh — Jones & Laughlin Steel Corp. advanced galvanized pipe prices $1 per ton effective Nov. 10. This action is in line with price advance put into effect by other producers late last month. Sellers are booked through 1951 on large diameter line pipe and no let-up in new demand is expected in the foreseeable future. Mills note continued heavy pressure for standard pipe items, which has prevented jobbers from augmenting depleted inventories. Carbon and alloy mechanical and pressure tubing production is still falling behind new order volume. Not all producers have followed Republic Steel Corp.'s action in discontinuing distribution of pipe on a consignment basis to jobber account.

Cleveland — Republic Steel Corp. reports the new mill it opened at Gadsden, Ala., last summer for production of large-diameter line pipe is operating far more satisfactorily than had been anticipated. The company also reports continued heavy and extended demand for all types of pipe it produces.

Los Angeles — Generally speaking, tubular goods are tighter than ever, although some faintly encouraging tendencies are being noted. Kaiser's Fontana mill, for example, is gradually increasing its pipe production. Buying by the oil companies and petroleum equipment fabricators continues at a record level, but some suppliers feel that these requirements may have hit a peak.

Warehouse . . .

Warehouse Prices, Page 167

Cleveland—Aware of a considerable volume of consumer substitution of cold-finished steel bars for the hard-to-get hot-rolled bars, one warehouse revealed it is being extra cautious in its inventory and ordering of the cold-finished product so that in event of a sudden change in demand it will not be caught with an over-supply of cold-finished.

However, demand for all steel products continues strong, with warehouses getting inquiries from large consumers who ordinarily would depend only on mills for steel.

Increased preparedness activities are resulting in a growing number of inquiries from airframe parts producers interested in alloy steels and high-tensile aluminum bars. Warehousemen have been told the demand for airplane materials at the peak of the present preparedness program will be only 15 per cent of the wartime peak. Consequently, the materials demand will be for small lots.

Philadelphia—Question of functional discounts to jobbers on stainless steel continues under active consideration. At least two stainless sheet producers continue to allow the usual discounts. The great majority of them do not allow these discounts, but many are beginning to believe that discounts should be restored, at least in some measure. Jobbers, who normally handle a substantial portion of the stainless steel distributed, describe the situation as highly difficult, with some reporting an appreciable decline in their sales.

Chicago — Probability that some type of steel allocation will continue in effect until demand-supply balance is struck is weighing heavily on distributors. With each tightening of the allocation screw, heavier demands are thrown upon them by consumers who do not come within preferred categories. Furthermore, reduction in first quarter quotas by mills to warehouses, as well as to consuming groups, means tightened conditions on all products and poorer inventory balance. In view of the bleak supply outlook, price considerations continue secondary, with price spreads prevalent among the various warehouses as the joint results of their geographical position in relation to mills and the mills' varied prices. The warehouse price structure is particularly confused in stainless as the result of abandoment by some mills of their customary "courtesy" discount, many warehousemen now having only the profit margin given by their ability to buy in quantity and sell in small lots.

Los Angeles — Steel jobbers are getting very little sheet and strip, and virtually no structural shapes. The latter in most cases are the tightest category of all for the warehouses. Some jobbers report improvement in their bar stock supplies. End of the shipping strike would be of aid in many product classifications, for thousands of tons in warehouse consignments are blocked off in the harbor. Although negotiations for a settlement are expected to resume, shippers are not optimistic about the chances for an early break in the tie-up.

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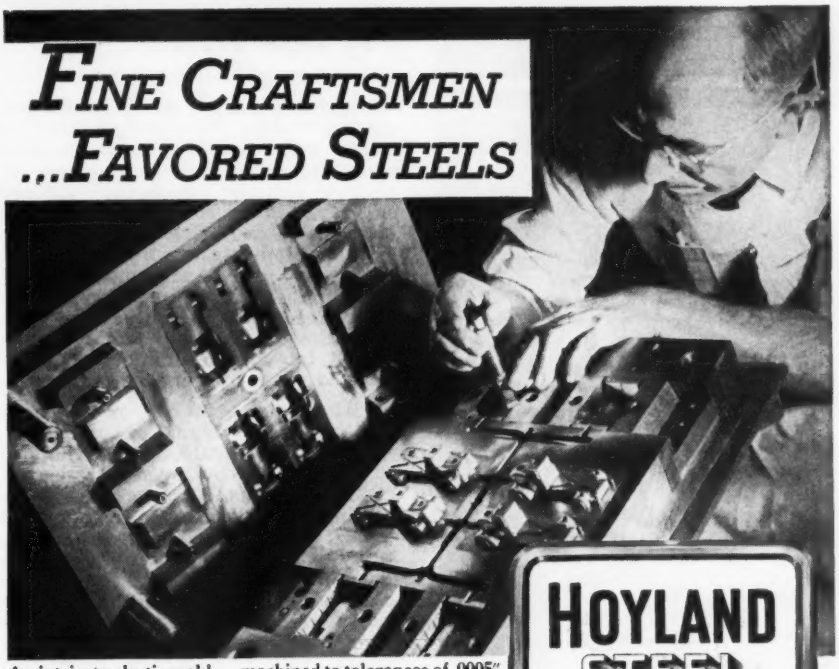

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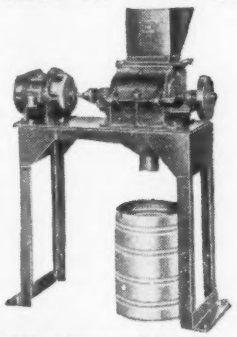

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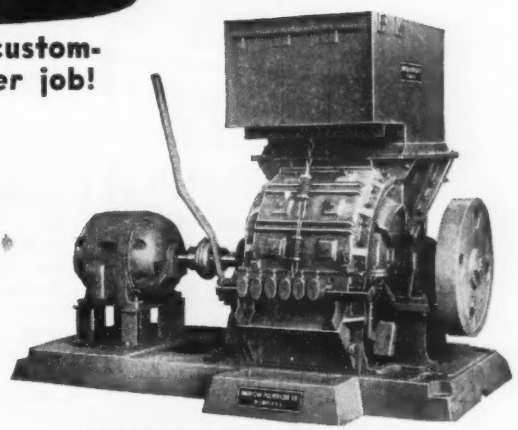

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Pig Iron . . .

Pig Iron Prices, Page 166

Boston—Advance of 75 cents per ton in Mystic furnace pig iron to $49.50 f.o.b. Everett, based on June operating costs, will be followed by another revision, probably upward slightly, Jan. 1; November costs will determine the price at that time. Mystic shipments are at furnace capacity and are easing most critical shortages. Pressure for tonnage in some directions is less than expected, indicating more foreign iron was purchased late in the summer than estimated even by smaller consumers.

Pittsburgh — Supply of merchant iron shows no signs of improving, with relatively little tonnage shipped into this area by other interests. Leading merchant iron producer here continues to produce well below rated capacity due to poor quality coke. Many jobbing foundries here shut down for the holiday last Thursday and the entire weekend. Gray iron jobbing shops report order backlogs have been sharply reduced in recent weeks, reflecting steady downward trend in new bookings.

New York — While pig iron supply continues to fall well short of requirements, district consumers claim that receipts are showing improvement. In some individual cases supply is actually sufficient to meet requirements. Some jobbing foundries, in fact, now appear a little more concerned about building up order books than they are about obtaining an adequate supply of raw materials.

Philadelphia — Some gray iron foundries in this district report a falling off in their backlogs and consequently are not pressing as hard for pig iron as heretofore. One casting maker cancelled half his quota for this month with one furnace. However, there is generally an excess of demand, even though pig iron supply is easing a little. Foreign importations continue to contribute to this easing in supply, although volume of foreign iron has leveled off and there is a softening in prices. For instance, one importer of foreign low phos iron has recently reduced his selling price $4 to $5 to around $85 c.i.f. A cargo of Norwegian iron was scheduled to arrive at this port late last week.

Chicago—Although prognosticators have been thrown into poor repute rather consistently since the end of the war, those still bold enough to hazard guesses as to when supply of iron will be sufficient to meet demand see the possibility of the gap's closing in the latter half of next year, assuming no major change in political or business conditions. Demand for foundry iron has not shown any slackening, although shrinking order backlogs are prompting an increasing number of foundries to solicit business.

Buffalo — With ingot production absorbing a large portion of current iron output as the scrap market remains deadlocked over prices, there is little indication of any nearby improvement in the tight merchant iron market. Minor tapering off in business among some casters is more than balanced by increased demands in other lines. In addition to urgent local demands, a substantial quantity of iron is moving out of the area. Sizable shipments are made to Michigan users while another producer is helping to supply the overall requirements of plants under the parent company. Production is also being pressed with only one of the area's 16 furnaces on the idle list. Bethlehem is rushing a relining job on one of its units at the Lackawanna plant.

Cincinnati — Shipments of pig iron into this district continue at the low level established in recent weeks, the shortage of iron being considered the principal factor in holding the melt at many points below capacity. Pressure for more tonnage is continuous against furnace interests who extend no promises for immediate improvement.

Birmingham—Pig iron output is at virtual capacity, but most users report no improvement in supplies with the exception of the slight easing recently credited to return of a government blast furnace at Gadsden. Indications are that iron supplies will remain tight well into next year.

St. Louis—This district's pig iron production, after three months' curtailment, is back to its 1000-ton daily mark with prospects the repairs may increase the capacity 40 to 60 tons. Consumers already are getting better supplies, and purchases of imported and high-cost outside iron are reported being cut sharply. Demand for pig iron from some small foundries is dropping, due mainly to their inability to get sufficient steel. That lag is being more than offset, however, by special orders from firms which have long been clamoring for bigger allocations. Therefore, the overall pressure for iron is not diminishing.

Scrap . . .

Scrap Prices, Page 170

Pittsburgh — Few trade authorities are willing to forecast future trend in scrap prices as result of possible congressional action in regard to both price and distribution control of steel. Any control of steel pricing would logically necessitate regulation of production costs, perhaps extending to establishment of price ceiling on raw materials, of which scrap is an important component. Some trade interests contend that threat of price controls will discurage higher scrap price levels, which action would only add fuel to the arguments of those in favor of price control. A stronger price tone is held possible by some scrap brokers as result of increased demand developing from those consumers seeking to augment inventories over coming months. However, future price trend is expected to be largely dependent on how much consumers can build up inventories before adverse weather conditions curtail scrap collection efforts. As long as the demand-supply situation in steel continues unbalanced, with mills scheduled at practical capacity for months ahead, some trade authorities contend no major weakness in scrap prices will develop because of general scarcity of scrap that will prevail. Greatest price resistance is noted among foundries for railroad specialties, reflecting downward trend in new orders booked the past few months. Railroad specialties eased to a range of $57.50 to $58.

New York — Brokers' buying prices continue steady on all grades except malleable, which is higher at $70, f.o.b. shipping point, on such scattered lots as are available.

Longshoremen's wildcat strike here last week did not interfere with movement of foreign scrap, the unloading of one cargo having been completed before the trouble began, and none having arrived since. Meanwhile, the leading eastern consumer was unloading a shipment at Baltimore. This consumer has ten cargoes of foreign scrap scheduled for arrival in this country within the next 30 to 45 days. At least one, if not two, of these cargoes will be German scrap.

Philadelphia — Open-hearth scrap prices continue unchanged in this district. Despite the volume of foreign iron coming in, consumers continue interested in building up inventories for the coming winter at current prices. As a matter of fact, stocks of eastern mills are better than a year ago, but are still not up to the point where buyers feel comfortable. One factor for strength at this time is the continued restricted flow of domestic scrap. Part of this is due to shortage of gondolas, but also contributing is a relatively limited flow of bundled scrap. District yards report that collectors are being more cautious in the material they are picking up and are consequently bringing in less. This caution stems from recent strong protests made over the quality of bundled scrap. The only price revision in the entire list is an advance in malleable cast, which is now holding at $80 to $81, delivered consuming plants.

Cleveland — Highlighting market activities here last week was arrival of a Great Lakes self-unloader vessel with 3000 tons of foundry scrap. Brought in by a leading broker here, the shipment consisted of No. 1 cast iron and railroad specialties. Receipt of a boatload of such scrap is unusual here.

Demand for foundry scrap continued strong. Due to an increase in demand in the South, the flow of material from that area has tightened, resulting in a $2 rise in several foundry grades here.

Improvement in steel mill scrap inventory positions has resulted in an easing in demand for charging box cast, with a resultant $2 decline in price. Also down $2 are some grades of railroad scrap as a result of an increased flow of such material. However, the commonly used open-hearth grades remained at formula price levels, although there still were reports of purchases over the formula. Demand for open-hearth grades at formulas continued strong and movement of material continued heavy, although shortage of railroad gondola cars was giving some transportation difficulties.

Buffalo—Despite talk of price control and the possibility of lower prices, the prolonged deadlock between dealers and leading mill consumers continues. Dealers are not as jittery over controls as might have been expected. One top seller explained that yard stocks are limited and if controls come a corresponding decline would take place also in collection prices, which would make for an equitable setup. At the present time, however, the stalemate in the market

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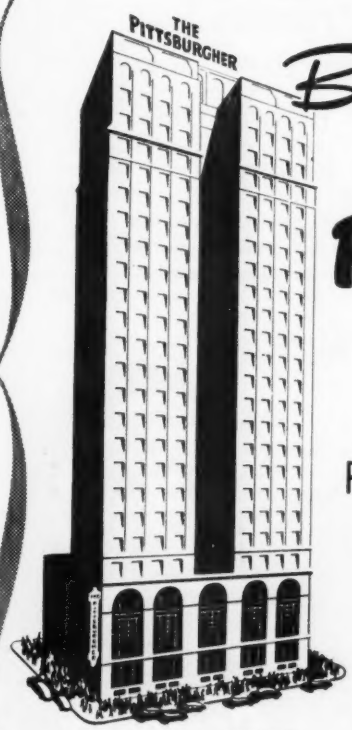

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goes on as dealers claim they are unable to accept new orders at the present bid of $42.25 a ton for No. 2 heavy melting and related items. Outside buying interests are still paying $1.50 to $2 a ton above the local range in nearby areas. As a result, a large portion of scrap, normally finding its way into local yards, is moving elsewhere. A small tonnage of extra quality No. 2 material changed hands last week at about $2.50 higher than the prevailing range. Railroad specialties dropped from $2 to $3 a ton.

Chicago — Earmarked and dealer scrap shipments continue to augment mills' stocks, but with winter approaching and all signs pointing to continuation of operations at the present high level constant buying seems to be the rule at firmly entrenched formula prices. On other grades, prices also are steady. Cast grades have shown little price variation recently, but there is a fairly wide feeling that if the slackening in foundry business continues over an extended period a slip from current high scrap price levels will occur. It is no secret that every melting shop would gladly increase its iron-to-scrap ratio if the iron were available.

Cincinnati — Scrap prices remain steady in this district, inventories held by major melters being one factor in the situation. Brokers' surveys disclose, however, little reserve tonnage in dealers' yards as a cushion against winter demands for scrap. Occasional complaints are heard on quality of shipments, although rejections are infrequent.

Birmingham — Scrap prices continue unchanged, but supplies are getting tighter. Scarcity of gondolas is credited with some of the inability to move supplies to dealers' yards.

Dallas — Supplies of scrap in local yards have grown tighter in the past couple of weeks. There is little accumulation of supplies, most yards keeping pretty well cleaned up. The current slow movement of metal into yards is partly due to seasonal labor pinch. Oil industry, which is one of the greatest sources of scrap in this area and which also is in its worst position on record for needed tubular goods, is disposing its scrap, for the most part, where it is in best position to bargain for supplies of pipe. Disposition of such scrap is usually made in individual deals, with actual prices seldom coming to light.

Houston — Tightness of scrap in this area is reflected in an increase in scrap prices posted by Sheffield Steel Co. the past week from $48 to $48.50 on No. 2 grade. Sheffield draws almost wholly upon the Texas area for its scrap supply, the new price indicating a short supply resulting from marked decrease in movement during the past three weeks.

Los Angeles — With demand increasing and receipts shrinking, users are getting desperate for scrap. Both Kaiser and Pacific States Steel Corp. are installing additional open hearths, increasing their scrap requirements. More than ever before, mills are going out to find their own material and do their own precessing. Prices are steady, but the undertone is strong, and dealers look for an upward move.

Seattle — The scrap market is firmer and buyers look with apprehension to the future as supplies are expected to decline with arrival of winter. Present receipts are about equal to consumption but inventories are not increasing and the outlook is not promising. While no announcement has been made, indications are for a further rise in steel scrap prices which at present are on the basis of $27.50 per gross ton, f.o.b. mill for heavy melting.

Semifinished Steel . . .

Semifinished Prices, Page 164

Pittsburgh — —Price range on wire rods continues unchanged. Greater activity in production of ingots for sale by steel foundries has been in evidence during recent weeks, reflecting in part the increased available melting capacity due to easing in demand for steel castings.

Pittsburgh Engineering & Machine Co. recently completed installation at the Warren, O., plant of Copperweld Steel Co. of an addition to the 29-inch 3-high blooming mill, including 24 and 21-inch 3-high sheet bar mills, with shear tables, piler and cradles. Under this arrangement rounds and sheet bars can be obtained in the same blooming mill roll passes.

Developing Chrome Deposits

New York — Robert D. McCarter, executive vice president, American Chrome & Magnesium Industries Inc., Seattle, Wash., revealed here last week that a new pilot plant for treating chrome ore will be in operation within 30 days. This is an initial step, he said, in the development of large American deposits of high-grade chrome ore controlled by his company. He estimated that 4 million tons of chrome are contained in these deposits.

"By the middle of 1950," he asserted, "when we get up to a maximum production of both domestic and foreign ore content briquettes, we will be getting upwards of 300,000 tons of chrome annually. That will be roughly equivalent to 30 per cent at present consumption of the United States, or 20 per cent of the world's consumption."

At the Twin Sisters mines, Washington, owned by the company, the lowest analysis of cleaned chromite cited was 50.5 chrome content and the highest 60.4, it is reported.

Canada . . .

Toronto, Ont. — Import permits now are required on all importations from the United States of certain types of structural iron and steel, under provisions of the Canadian Export and Import Permits Act, effective Oct. 25. This step was taken in connection with the agreement reached with the United States government to limit imports of iron and steel to a maximum of 200,000 tons for the last three months this year. The new import control regulation applies to various iron and steel angles, beams, channels, columns, girders, joints, tees, zees, used chiefly in the con-

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struction of large buildings and in heavy manufacturing.

Arrangements are being made to issue import permits which provide for the importation, during the balance of this year, of specific tonnages of steel where a manufacturer or importer had a standard pattern of importations, while specific or spot importations will be the subject of individual permits. Imports issued, or which may be issued, under the Emergency Exchange Conservation Act, will be honored in connection with the importation of the items covered by the new regulation. All structural steel or iron covered by the regulation which was in continuous transit to Canada on or before Oct. 24, as well as steel from countries, other than the United States, will not require an import permit.

Application for new permits will be handled by the Import Permit Branch of the Department of Trade and Commerce.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2800 tons, apartment, 68th St. and 5th Ave., New York, to Harris Structural Steel Co., that city.

930 tons, bridges and structures, New Hampshire turnpike, Seabrook-Portsmouth, N. H., to Bethlehem Steel Co.; Savin Construction Co., East Hartford, Conn., general contractor.

700 tons, antimony smelter, Bradley Mining Co., Stibnite, Idaho; 400 tons to Olson Mfg. Co., Boise, Idaho, 300 tons to unstated California interests.

675 tons, power plant extension, South Carolina Power Co., Charleston, S. C., through Gilbert Associates, Reading, Pa., to Virginia Bridge Co., Roanoke, Va.

375 tons, S. S. Kresge store, Harrisburg, Pa., through Ritter Bros., that city, to Bethlehem Contracting Co., Bethlehem, Pa.

250 tons, warehouse, National Hardware Stores, Seattle, to Isaacson Iron Works, Seattle.

160 tons, Catholic Youth Center, Scranton, Pa., to American Bridge Co., Pittsburgh.

125 tons, 6-story apartment house, 176th St. and Grand Ave., New York, to Grand Iron Works Inc., that city.

100 tons, consolidated quarters apartment building for Veterans Administration, Wilmington, Va., to Virginia Engineering Co., Newport News, Va.

Unstated tonnage, Army Engineer Corps project, Bismarck, N. Dak. to Commercial Shearing & Stamping Co., Youngstown, O., $419,185.15, and Elizabeth Iron Works, Elizabeth, N. J., $39,187.20.

Unstated tonnage, Columbia Basin project, Bureau of Reclamation, spec. 2408, American Bridge Co., Denver, low $136,682 f.o.b.; steel towers, Missouri Basin project, spec. 2409, American Bridge Co., Denver low $19,200.

STRUCTURAL STEEL PENDING

2700 tons, plain material for miscellaneous Pennsylvania state work; bids Nov. 30.

2500 tons, approximately, 14-story central office building, New York Board of Transportation, Brooklyn, N. Y., bids asked.

2000 tons, power house, Wilmington, Del., United Engineers & Constructors, Philadelphia, engineers in charge.

2000 tons, power house, Kansas City, bids being asked through Ebasco Services Inc., New York.

2000 tons, New York state bridge work, Erie county; bids Nov. 24.

2000 tons, section, Municipal ferry terminal, St. George, Staten Island, N. Y., bids closed Nov. 12.

1720 tons, New York state bridge work, bids closed in Albany Nov. 10; 600 tons in Onondaga county, 500 tons in Ulster county, 500 tons at Port Byron, N. Y., and 120 tons in Erie county.

1200 tons, county bridge and pumping station, Cook county, Ill.; bids in.

1040 tons, state bascule bridge, Cape May county, N. J.; also 105 tons, reinforcing bars.

1000 tons, state office building, Hartford, Conn.; Gilbane Construction Co., Providence, R. I., low on general contract.

963 tons, steel piling, Corps of Engineers, inv. 27, Buffalo, N. Y.; bids Nov. 16; work also takes 36 tons tie rods, 68 tons miscellaneous assemblies and 3.23 tons bolts, nuts and washers.

800 tons, power plant, Worcester County Power Co., Worcester, Mass.

650 tons, Washington state highway bridge, Kitsap county; bids to Olympia Nov. 19.

575 tons, wall armor, reconstruction lock two, 56-foot lock only, Corps of Engineers, Pittsburgh, inv. 41; bids postponed to Nov. 23; work also takes 169,000 square feet steel sheet piling.

525 tons, engineering building, University of New Hampshire, Durham, N. H.; Volpi Construction Co., Boston, low on general contract.

463 tons, bridge, Section 202-F, Madison county, Ill.; bids to state, Nov. 16.

438 tons, steel bearing piles, H-sections, Corps of Engineers, Kansas City, Mo. inv. 105; bids Nov. 16.

378 tons, bridge, Section 4-2F, White county, Ill.; bids to state, Nov. 16.

370 tons, addition, School No. 124, Bronx, New York; bids closed.

350 tons, addition, School No. 246, Kings county, New York; bids closed.

317 tons, bridge, Section 18-F, Brown county, Ill.; bids to state, Nov. 16.

300 tons, roadway decking, Washington state bridge, Kitsap county; bids to Olympia, Nov. 19.

250 tons, Caldwell Ave. bridge, Cook county, Ill.; bids in.

250 tons, Washington state highway bridge, Kittitas county; bids to Olympia, Nov. 19.

200 tons, patients' building No. 3, state hospital, Wernersville, Pa.; bids Dec. 1.

174 tons, bridge, Section 1-F, White county, Ill.; bids to state, Nov. 16.

139 tons, bridge, Section 18-F, Macoupin county, Ill.; bids to state, Nov. 16.

100 tons, school, Arlington, Mass.; Volpi Construction Co., Boston, low on general contract.

100 tons, admission building, state hospital, Warren, Pa.; bids Dec. 1.

100 tons, state highway bridge, Hamden, Conn.

Unstated, warehouse, F. W. Woolworth Co., Chicago; bids asked.

Unstated, miscellaneous items, Coulee power plant; bids to Bureau of Reclamation, Denver, Nov. 16.

Unstated, shop, Smithway Machine Co., Seattle; Chauncey Warnecke, Seattle, engineer.

REINFORCING BARS . . .

REINFORCING BARS PLACED

630 tons, bridges and highway, New Hampshire Turnpike, Seabrook-Portsmouth, N. H., to Bethlehem Steel Co.; Savin Construction Co., East Hartford, Conn., general contractor; 210 tons, sheet and bearing piles, awarded same fabricator.

300 tons, addition to plant of Seattle Times, to Bethlehem Pacific Coast Steel Corp., Seattle; George Teufel, Seattle, general contract.

227 tons, Merrimac office, Illinois Bell Telephone Co., Chicago; to Joseph T. Ryerson & Son Inc., Chicago.

175 tons, power house, state hospital, Peoria, Ill., through S. N. Nielsen Co., Chicago, to Laclede Steel Co., St. Louis.

100 tons, paper storage building, Time Inc.,

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S. Halsted and Chicago river, through S. N. Neilsen Co. Chicago, to Bethlehem Steel Co.

70 tons, addition, Evanston hospital, Evanston, Ill., through R. C. Wieboldt Co., Chicago, to Joseph T. Ryerson & Son Inc., Chicago.

REINFORCING BARS PENDING

2000 tons, housing project, East Boston, Mass.; Bowen Construction Co., Boston, general contractor.

280 tons, various Washington state road projects; bids to Olympia, Nov. 19.

Unstated, various Oregon state reinforced concrete viaducts; general contracts awarded as follows: Benton county, 223-foot span, to J. F. Johnson, Sherwood, $47,555; Lane county, two spans 63 and 119-feet, respectively, to Eric Enquist, Troutdale, $49,135.

Unstated, various Oregon state reinforced concrete viaducts: Coos county, 172-foot span, Tom Lillebo, Reedsport, low $182,355; Lincoln county, 100-foot span, Harry Hamilton, Eugene, low, $128,555, rejected. Douglas county, steel and timber structure, Tom Lillebo, Reedsport, low $174,470.

Unstated, substation at Olympia, Wash., for Bonneville Power Administration; general contract to Utility Construction Co., Tacoma, $54,738.

Unstated, Navy communication station, Bainbridge Island, Wash.; bids in Nov. 9.

Unstated, telephone garage, Seattle; J. B. Warrack Co., Seattle, low $92,300.

Unstated, Soap Lake siphon and other structures, Columbia Basin project; bids to Bureau of Reclamation, Denver, Nov. 16.

Unstated, substructure and piers for 1352-foot Clearwater river bridge; bids to Boise, Idaho, Nov. 19.

Unstated, plant for Power & Brake Equipcent Co., Portland, Oreg.; bids Nov. 15.

Unstated, senior high school, Beloit, Wis.; bids Dec. 7.

PLATES . . .

PLATES PLACED

Unstated, 13,600 feet, 12 and 16-inch steel pipe, for Walla Walla, Wash., to Armco Drainage & Metal Products Inc., Portland, Oreg., low $81,046.

PLATES PENDING

3000 tons or more, Soap Lake siphon, Columbia Basin; bids to Bureau of Reclamation, Denver, Nov. 16.

211 tons, hull plates, Navy Bureau of Supplies and Accounts, inv. 7148, Brooklyn and Bremerton; bids Nov. 16; also 120 tons, steel angles, inv. 7144; bids in.

130 tons, black and galvanized, Navy Bureau of Supplies and Accounts, inv. 7145, Brooklyn, N. Y., and Bremerton, Wash.; also 42 tons floor plates inv. 7147; bids in.

Unstated, 15,000 feet steel piling, Washington road project, Stevens county; bids to Olympia Nov. 19.

PIPE . . .

STEEL PIPE PENDING

Unstated, 2400 feet, 14 inch water pipe and fittings; bids to Grandview, Wash., Nov. 22.

Unstated, lap welded pipe and fittings; bids to Coulee Dam, Nov. 17.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Nashville, Chattanooga & St. Louis, nine 1500-horsepower diesel-electric engines, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

RAILROAD CARS PLACED

Western Pacific, 250 gondolas, to Greenville Steel Car Co., Greenville, Pa.

RAILS PLACED

Western Pacific, 70 miles of 115-pound steel rail, to Colorado Fuel & Iron Co., Denver.

CONSTRUCTION AND ENTERPRISE

ARKANSAS

EL DORADO, ARK.—Lion Oil Co. has awarded a $1,250,000 contract to Chemical Construction Co., Empire State Bldg., New York, for a sulphuric acid plant and a $750,000 contract to Blaw-Knox Construction Co., Farmers Bank Bldg., Pittsburgh, for an ammonium sulphate plant; Chemical Construction Co., engineer and architect.

CALIFORNIA

BERKELEY, CALIF.—Ames Harris Neville Co., 2800 Seventeenth St., San Francisco, has awarded a $300,000 contract to Parker, Steffens & Pearce, 135 S. Park St., San Francisco, for erection of a paper bag plant; M. J. Pflueger, 580 Market St., San Francisco, architect.

FONTANA, CALIF.—Henry J. Kaiser, c/o contractors, has awarded a $17 million contract to Kaiser Engineers, 1206 S. Maple Ave., Los Angeles, for the construction of a blast furnace.

FRESNO, CALIF.—Wilco Iron & Steel Co. is the firm name under which Ray H. Coffey and Hazel N. Kirk have published a certificate that they are conducting business at 6344 Blackstone Ave.

SAN FRANCISCO—Public Utilities Commission, City Hall, is planning to build a $1 million central repair shop for the municipal railway; De Leuw, Cather & Co., 20 N. Wacker St., Chicago, consulting engineers.

CONNECTICUT

WEST HAVEN, CONN.—Metal Products Corp., 510 First Ave., plans to spend $160,000 to rebuild its factory and add a new unit on First Ave.; plans by Leo F. Caproni & Associates, 1221 Chapel St., New Haven.

ILLINOIS

CHICAGO—International Rolling Mill Products Co., 5033 S. Kedzie St., plans to build a $3 million factory and office; plans by Rawson & Eisenberg, 4930 W. Adams St.

PEORIA, ILL.—United States Engineer's Office, 520 Merchandise Mart, Chicago, is planning to relocate the Toledo, Peoria and Western Railroad tracks in connection with the Farm Creek Flood Control Project at a cost of approximately $3 million.

STREATOR, ILL.—Owens-Illinois Glass Co., Alton, contemplates the erection of an addition and alterations to its plant here to cost $150,000.

INDIANA

BROWNSTOWN, IND.—Kiefer Paper Mill, J. Kieler, treasurer, plans to rebuild its paper mill at a cost of $300,000.

INDIANAPOLIS—Metropolitan Produce Terminal plans to spend $2 million for a terminal at Brightwood Airport to be built by Producers Realty Corp., J. M. Rosa, president, 320 S. New Jersey St.

IOWA

IOWA FALLS, IOWA—Northwestern Bell Telephone Co., 604 Ninth St., Des Moines, has awarded a $250,000 general contract to Ringland-Johnson Inc., 820½ Locust St., Des Moines, for the erection of a new telephone exchange and office building here; Dougher, Rich and Woodburn, 302 Garver Bldg., Des Moines, architects.

MONTICELLO, IOWA—Iowa Electric Light & Power Co., Cedar Rapids, contemplates spending $105,000 on power plant and generating equipment here.

KANSAS

ELLSWORTH, KANS.—Farmers Union Co-operative, P. J. Nash, general manager, has awarded a $140,000 contract to Chalmers and Borton Construction Co., Hutchinson, for the erection of a grain elevator.

MICHIGAN

DETROIT—General Motors Corp., 2-153 Gen-

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eral Motors Bldg., has awarded a $1 million contract to Darin & Armstrong, 2041 Fenkell St., for a manufacturing section, office, and an addition to Detroit Transmission Division.

DETROIT—Stroh Brewery Co., 909 E. Elizabeth St., has awarded a $1,500,000 contract to O. W. Burke Co., 1032 Fisher Bldg., for construction of a plant.

NEW JERSEY

MURRAY HILL, N. J.—Bell Telephone Laboratories, 563 West St., New York, has awarded a $1,250,000 contract to Mahony-Troast Construction Co., 657 Main Ave., Passaic, for construction of a laboratory; Voorhees, Walker, Foley & Smith, 101 Park Ave., New York, architects.

NEW YORK

NEW YORK—Navy Bureau of Yards and Docks has awarded a $15 million contract to Thompson-Starrett Co. Inc., 444 Madison Ave., for construction of permanent facilities at the Naval Hospital, St. Albans, Long Island, which will include a betatron therapy building, an administration and treatment building, a subsistence building, and six ward buildings.

NIAGARA FALLS, N. Y.—Carborundum Co., Adams Ave., plans to build a $300,000 plant.

OHIO

CLEVELAND—Auto Panels Inc. has been formed by George H. Schofield, 1354 E. 141 St., and Robert S. Cloyd, 12804 Phillips Ave., to manufacture and sell auto panels, parts and accessories.

CLEVELAND—Leece-Neville Co., 5363 Hamilton Ave., is expanding its line of electrical products for the automotive, marine, diesel, aircraft and manufacturing industries by adding special lift and propulsion motors for industrial electrical trucks.

CLEVELAND—MacGregor Tractor & Implement Co. Inc. has been formed by A. Bensley, president, J. A. Matheson, vice president, and J. E. Barnum, treasurer, for the production of spring tooth harrows and two-wheel type lime spreaders.

CLEVELAND—Standard Oil Co. of Ohio is constructing a $1,500,000 storage and transportation terminal on Bradley Rd. as part of its three-year $100 million expansion program.

CLEVELAND—Schaeffer Steel Products Inc. has been incorporated to establish a new steel warehouse here. Some new equipment probably will be installed when it locates a building of its own.

CLYDE, O.—Clyde Porcelain Steel Corp., C. C. Wells, president, has awarded a $1 million contract to Fremont Engineering Co., Fremont, for construction of a plant.

CONNEAUT, O.—Pittsburgh & Conneaut Dock Co., Keith C. Stevens, president, will undertake rebuilding of Dock 4 upon conclusion of the navigation season.

ELYRIA, O.—Cascade Plating Inc., a new corporation located at 210 Malcolm Ct. with Dr. S. J. Birbeck as president, Archie E. Penfound, vice president, and George Valerius, secretary and treasurer, is engaged in cadmium plating for industries throughout this area and plans to install additional equipment.

ELYRIA, O.—Progressive Plating Corp. has been incorporated by George P. Walton, agent, 271 Columbus St., Donald H. Marsh, 409 Earl Ct., and Joseph E. Rhoads.

LORAIN, O.—Brush Beryllium Co. plans to rebuild its plant at a cost of $350,000.

MANSFIELD, O.—Richland Tool & Die Co. has been incorporated by Anton Herz, Dale E. Rose and Everett Schaus, agent, 252 W. Sixth St.

NEWCOMERSTOWN, O.—Sunshine Reclaiming Corp., Chattanooga, Tenn., is preparing to reclaim by magnetism between five and seventy-five tons of iron daily from land south of the Jas. B. Clow plant here where for years molding sand has been dumped.

NEW LONDON, O.—Newlon Metal Products Co. has undertaken an expansion program to provide additional factory space.

WARREN, O.—Cliffs Construction Co. has been incorporated by Clifton F. Stuart, Paul E. McGowan and Charles S. McKinney for the purpose of erecting and removing heavy machinery and industrial equipment of all types and steel and pipe erection and welding.

YOUNGSTOWN, O.—Harr Iron Co., 1636 Wilson Ave., has been incorporated by Aaron A. Harr, Henry H. Harr, and Joseph W. Harr.

YOUNGSTOWN, O.—Republic Steel Corp., Republic Bldg., Cleveland, plans to electrify its Bessemer plant, install two electric motors and controls, and build substations.

PENNSYLVANIA

ALIQUIPPA, PA.—Jones & Laughlin Steel Corp., Ben Moreell, president, will spend $70 million for expansion which will include six open hearths at the Pittsburgh Works and additional finishing and tinning facilities at the Pittsburgh and Aliquippa plants.

BRISTOL, PA.—Kaiser-Fleetwings is planning a $1 million plant expansion program.

SHARON, PA.—Westinghouse Electric Corp., Union Bank Bldg., has awarded a $500,000 contract to Ebasco Services Inc., 2 Rector St., New York, for design and construction of a transformer-tank shop.

PRICES OF LEADING FERROALLOYS PRODUCTS

(*Continued from Page 167*)

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk, 10.00c per lb of briquet, c.l. packaged 10.8c, ton lot 11.6c, less ton 12.5c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.0c per lb of briquet, c.l. packed 10.8c, ton lot 11.6c, less ton 12.5c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 5.75c per lb of briquet, c.l. packed 6.55c, ton lot 7.35c, less ton 8.25c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 5.90c, c.l. packed 6.70c, ton lots 7.50c, less ton 8.40c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) 80.00c per pound of Mo contained, fob Langeloth, Pa.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.). Contract, ton lots, 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.). Ton lot $1.28, less ton $1.35. Fob Niagara Falls, N. Y., freight allowed to St. Louis. Spot add 5c.

Ferrotitanium, High-Carbon (Ti 15-18%, C 6-8%). Contract, $160 per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21% C 3-4.5%). Contract, $175 per ton, fob Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

VANADIUM ALLOYS

Ferrovanadium: Open Hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5 max.). Contract, any quantity, $2.90 per lb of contained Va. Delivered. Spot, add 10c. **Crucible-Special Grades** (Va 35-55%, Si 3.25-4% max., C 0.5-1% max.), $3. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.), $3.10.

Vanadium Oxide: Contract, less carload lots, $1.20 per lb of contained V_2O_5, fob Bridgeville, Pa. Spot, add 5c.

Grainal: Vanadium Grainal No. 1, 93c; No. 6, 63c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

TUNGSTEN ALLOYS

Ferrotungsten: (W 70-80%). Contract, 10,000 lb W or more, $2.25 per lb of contained W; 200 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract. 100 lb or more. 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered. Spot, add 5c.

Borosil: (3 to 4% B, 40 to 45% Si), $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton in carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Contract, ton lot 2" x D, $2.75 per lb of contained Cb, less ton $2.80. Delivered. Spot, add 10c.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%; Zr 0.75-1.25%, C 3.50-5%). Carload, 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%; Al 6-8%, Zr 3-5%, Ti 9-11%, Boron 0.55-0.75%). Carload, packed, 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed ½" x 12 M, 16.5c per lb of alloy, ton lots 17.25c, less ton 18.5c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 42-46%, Ca 5%, Ti 9%). C.l. packed, 16.50-17.00c per lb of alloy; ton lots 17.90-18.00c; less ton lots 19.40-19.50 fob Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%; V-7, Cr 28-32%, Si 15-21%, Mn 14-16%). C.l. packed, 14.25c per lb. of alloy ton lots 15.75c; less ton lots 17.00c, fob Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al). Packed, lump, carload 11c, ton lots 11.25c, smaller lots 11.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Ferrophosphorus (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base): Gross tons per carload, fob sellers' works, Mt. Pleasant, or Siglo, Tenn.; $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb. contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c. Effective Jan. 1, 1949, price will be $1.10, Langeloth.

Technical Molybdic-Oxide: Per lb, contained Mo, fob Langeloth, Pa., packed in bags containing 20 lb of molybdenum, 80.00c.